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NOTULÆ AD PLANTAS ASIATICAS.

Part IV.

DICOTYLEDONOUS PLANTS.

BY THE LATE

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PREFACE.

With regard to the old opinion of spiral vessels being confined to flowering plants only, it may be remarked that they have been found in Lycopodiaceæ by Mr. Valentine. Indeed, they exist in abundance, simple and compound, in the gyrate portions of the rachis in many, perhaps all Filices; not that their presence depends on this gyration, but on the later development of these parts: since it is found that nothing but ducts are present in the older parts of many plants, while they occur with spiral vessels in the younger.

This was a mere assumption and until all and every link connected with the great chain be clearly defined, the distinction between flowering and flowerless, or rather sexual and esexual, is to be considered as artificial. We assume the constituent of the latter to be esexual because as yet we are thoroughly ignorant of their reproductive organs.

That the age of exogens may be known by the concentric circles exhibited by a section of the trunk, there are so many exceptions, particularly in tropical vegetation, that one may reasonably doubt its being the type or normal form of Exogens.

Cruciferæ.—From the examination of a species of Sinapis commonly cultivated throughout Assam for mustard and oil, my view of the structure is that the

order is dodicandrous. The stamina being arranged in 3 series of which the outermost is incomplete, the two lateral ones or those opposite the lateral sepals being alone developed, but they are still smaller than the others which form the intermediate series, and which are consequently opposite the petals. The innermost is represented by 4 glands evidently situated on the same plane, or forming a single verticel, and these are placed opposite the sepals, the two lateral ones being placed within the corresponding stamina. I attach considerable importance to the fact of the 2 stamina opposite the lateral sepals being invariably smaller, as it points out a tendency towards the total disappearance of the outer series. It will be seen that this view accords much with Mr. Lindley's: particularly as regards the incompletion of the outer series.

With regard to the composition of the pistillum, I incline to Mr Lindley's opinion. I think that there are evident traces of 4 stigmata and consequently of as many styles: and these stigmata are so placed, namely, opposite the sepals, that the idea of their forming portions of two stigmata must be incorrect. If such were the case the line of division of either, should be opposite the lateral sepals.

I may here remark that this opinion seems to me to derive considerable strength from the consideration of the form and structure of the style, and its supply of vascular fascicles, these are 4, occupying the axis of the 4 angles. The centre is occupied by a transverse opaque line whether vascular or not, I am unable now to say. The number likewise of vascular fascicles occupying the axes of the component parts of the fruit

are 4. If the placentiferous valves were portions of the sterile (right and left) valves, such would not be the case. Then taking into consideration the want of continuity of structure between the two, I think there is very little doubt of the accuracy of Mr. Lindley's theory.

In *Thlaspi* I find traces, although obscure, of a quaternary division of the stigma, and as in the instance cited before, the divisions are opposite the sepals, a fact on which great stress is evidently to be laid. The alternation of the four larger stamens (which are opposite the anterior and posterior sepal) is obscure, still the anticous and posticous stamina, which should be opposite the placenta are evidently wanting, the smaller are as usual opposite the lateral sepals, while the glands instead of being opposite the sepals, are opposed to the petals. The larger stamina still seem to belong to the petals, some allowance being made for displacement. In this case the 5th series, or the second calycine one is totally wanting. Thus probably Thlaspi is 16 androus. The following numbers refer to the series as I have supposed them:

1. Sepals.
2. Petals.
3. Two lateral developed.
4. Glands.
5. Wanting.
6. Developed but displaced.
7. Carpellary leaves.

The style has 4 vascular fascicles and an opaque line in the centre.

In another, *Nasturtium* (Assam collection *no.* 454,)

a similar arrangement takes place, but a gland exists opposite the anterior and posterior sepal, so that the outermost series may be said to be more complete. There is no trace of a 4-nary division of the stigma, still I assume it from the transverse sulcus visible on the surface of the stigma dividing it into an anterior and posterior lobe, but I have not been able to ascertain the number of vascular fascules of the style. The numbers refer as before.

1. Sepals.
2. Petals.
3. 2 glands, 2 stamens.
4. Glands.
5. Wanting.
6. Stamens.
7. Carpellary leaves. 1836.

Anonaceæ.—In the Ovulum of *Artabotrys odoratissimus* the foramine and secundine adhere, the latter has a fungous opening which projects beyond that of the primine

From a perfectly developed flower during impregnation, the ovary is 2-ovulata, ovulis basi loculi affixis *collateralibus*. 1835.

Magnoliaceæ.—In *Magnolia pumila* the ovula are situated transversely, that is, the raphe is not anterior or posterior, but lateral with respect only to the axis of the ovarium or the placenta. The secondine is quite distinct. The excavation of the nucleus is also very distinct. 1835.

Menispermeæ.—Cissempelos is a remarkable plant, and at one time I thought the female flowers to be dislocated, as it were formed on the same plan with the

males, and with four ovaria: the situation of the placental suture, which is anticous, is however an insuperable objection. The ovarium is never straight, nor is the incurvation of its apex gradual, but almost sudden. The spurious dessespement is a mere increase of growth of the placenta or rather of the part sustaining it, and it consequently does not consist of two plates. It is not a true drupe, since it is the testa which has become osseous, as is evident from the presence of the micropyle on it. In addition to which I have traced its development. The albumen is copious, and the radicle superior. The cotyledons are incumbent or rather they are opposite the narrow and true faces of the seed. The testa at a very early period (but after fecundation) has contracted an adhesion with the pericarp.

Dipterocarpeæ—The saul, Shorea robusta, a gigantic Dipterocarpus exists in Upper Assam, lat. 28 N. Two species are found at Moulmein lat. 17 N. besides many other species representatives of other genera of this family.

Hamamelaceæ.—Fothergilla has the calyx truncate irregularly toothed. The filaments do not seem to be a multiple of the floral envelopes. They vary in number from 18 to 23 or 24. The anthers are quadrangular, not turned inwards and open longitudinally. The cells of the endothecum are ovate or globose, and the fibres well marked. In one case I found 2 filaments antheriferous proceeding from a common one, in that case the cohesion had taken place between 3, the central one being quite rudimentary. There are no sterile

anthers. DeCandolle suggests that the outer series may be transformed petals.

Petals are frequently transformed into stamina in Bucklandia, which is exstipulate. The anthers are *valvular* in Sedgiwickia and Fothergilla. The ovula are 12 in Bucklandia, the lower two of each cell becoming perfect seeds. They are indefinite in Sedgiwickia in which the lowermost only, and that not often, is perfected. Both these genera have the calyx of Fothergilla and the wood of Coniferæ. Mr. Lindley is mistaken in assigning deciduous valves to the anthers; this I think is mentioned by Mr. Brown as occurring only in Hammallis sinensis.

The valves of Bucklandia are very unequal, both are permanent. This genus is remarkable for having its buds which are always terminal enveloped in two scales, resembling much in form and situation stipulæ.

Haloragеæ.—In Mynophyllum tetrandium Roxb., the seeds are arcuate and the embryo is necessarily curved.

Circæaceæ.—One species occurs on the Khasyah hills.

Rhizophoreæ.—The stamina in Rhizophora mangle are not twice the number of the petals but varying from 9 to 12. In Rhizophora as I limit it, they do not at all spring from the same points as the petals. The anthers in this genus are multilocellar the cuticle separating nearly throughout into anticous and posticous valves as the calyx is in some nearly inferior, the point cannot be always crowned by the calyx. The cotyledons are flat only in Bruguiera and perhaps in Carallia. In

Rhizophora and Bruguiera decandra the cotyledons are fleshy and capped by the original integument of the ovula; eight species of this genus are found on the Tenasserim coast only. Rhizophora and Bruguiera are natives of the shores of the tropics. Carallia is an inland marshy genus.

The peculiarity of the anthers was first hinted at by Jacquin and subsequently remarked upon by Mr. Brown, all others seem to have neglected it.

Melastomaceæ..—Although Mr. Brown in the appendix to Captain Tuckey's Voyage, first pointed out the peculiar situation of the anthers during æstivation, I may remark that it was not overlooked by Dr. Roxburgh, see his account of Osbeckia tetandria Flora India, vol. 2, p. 224. The manuscript of which is of a prior date to that of the Appendix.

In India this family is not limited to the tropics, Sarcopyramis of which at least 3 species exist is certainly extra tropical, so are some species of Sonerila, Melastoma malabathrica is found as far as 28 N. and most probably further.

Memecyleæ.—One species of Memecylon M. pellucido punctatum, has as its name denotes pellucid dots.

Mr. Brown's statement in Tuckey's Voyage, that this Order does not differ sufficiently from Melastomaceæ, is borne out by the existence of a Burmese genus. Apterixis trinervis M. in which the leaves are ribbed, and the fruit entirely melastomaceous although of a very peculiar structure, while the flowers exactly resemble those of Memecylon, with the exception of course of the ovary. The number 9 is of frequent occurrence

in the ovula of Memecylon and at one time I thought it to be so definitely.

Myrtaceæ.—It is difficult to reconcile the structure of the seeds of Careya and Barringtonia, but unless a reversion of the usual direction has taken place, they certainly are not dicotyledonous. The whole section should be removed from Myrtaceæ and raised to the rank of a distinct order.

Combretaceæ.—Mr. Brown's remarks upon this Order in his Prod. so it cannot be said to be without a character since a diagnosis is certainly given.

Species exist in India of Pentaptera and Combretum as far north as 28° N. lat.

The flowers of Terminalia Bellerica have a villanous sterco raceous odour.

Elæagneæ. This Order is certainly due to Mr. Brown, who first pointed out, that Jussieus Elæagnæ contained three very distinct Orders, Santalaceæ, *Elæagneæ* and *Combretaceæ*, and although he gives no character, yet an essential diagnosis is contained in his remarks : see Santalaceæ, Prod. 350-351.

The fruit of Elæagne is generally excessively sour and astringent. One species is eaten by the Burmese, and one by the Assamese.

Cytineæ.—Mr. Brown has himself confuted his original statement ; spiral vessels do exist in Rafflesia.

Santalaceæ.—The ovula of Santalum album differs from all others with which I am acquainted in the embryo being developed outside of the nucleus, and in the protrusion of what I call the albuminary membrane in the apex of which the first changes incident to fecundation take place.

Olacineæ.—Among two or three instances of coincidence of opinion with Mr. Brown, (I wish I could say there were more) without previous knowledge that such was the case, in my Mergui notulæ I referred Olax towards Santalaceæ, in which Notulæ a sketch of the structure of the ovarium will be found.

Stilagineæ.—To this Order belongs Roxburgh's Ulmus integrifolia. In habit and stipulation it certainly approaches to Cupuliferæ. In its ovarium, which however is always binarily composed, direction of it ovula their structure, and in habit it agrees with Euphorbiaceæ, especially in the presence of milky juice which occurs in a Nepalese and Bootan genus Gymnobotrys.

Salicineæ.—A few species occur in India within the tropics, one occurs about Calcutta, and two in the Tenasserim coast.

Hippocrateaceæ—The trachea-like structure of the spiral vessels connecting the testa and cotyledons in Hippocratea, occurs in 2 Labiatæ, Salvia verbenacea, and one Hyptis a native of Madras. In both the tracheæ like threads are less highly developed than in Collomia and Casuarina in which last they are perhaps at the maximum.

Vitaceæ.—Vitis and Cissus do not differ according to Mr. Brown, all the species of the latter are to be referred to Vitis. The albumen is often rimose in which particular Leea agrees remarkably. This genus is certainly very nearly allied to this order, far more so than to Meliacæ with which in the structure of its seeds it differs entirely.

Connaraceæ.—In Eurycoma (longifolia Jack) the ovula are erect. After flowering however the non abortive ovula is from an unequal growth of the ovarium, carried upwards to such a degree that the seed becomes really pendulous.

Anacardiaceæ.—In Anacardium, the funiculus is lateral and even parietal. The ovula at a very early period is transverse with respect to the axis, neither the petals or stamens are perigynous, the stamens are hypogynous, the petals inserted into the fleshy base of the inflected portions. Dr. Sprengel wisely includes this genus in Enneandria although he says, stamina decem.

In Mangifera, the stamens are distinctly hypogynous and united at their bases into a short annulus. Into this just below the sinus of the stamens, the petals are inserted by a central spot, and not by the whole of their bases. In this genus also the ovule is fixed laterally; the funicle being adherent to the paries of the ovarium. The foramen looks towards the bottom of the ovarium.

In the Diagnosis the leaves are said to be without pellucid dots. Their definite stamens certainly do not distinguish them from Leguminosæ.

As the hypogynous insertion of stamina is certainly the most natural, no hypogynous order should have perigynous stamina ascribed to it because one genus happens to present an anomaly, and which Mr. Brown seems to think indicates a more perfect development. In Syndesmis, Swintonia, and Melanorrhæa, nothing can be more plain than the hypogynous insertion of the stamina.

The order is remarkable for a tendency to coalition of the petals with the stamina, which is carried to excess, as well as that of the stamina to the stalk of the ovarium in Syndesmis.

Coriareæ.—The raphe occupies that side of the ovulum, which is next the dorsal suture of the ovary. This is the case in the youngest stage in which I have examined it, but still most likely subsequent to impregnation. I cannot speak positively concerning any torsion of the funiculus, although in one or two instances a semitorsion certainly appeared to exist, I have one from the Abor hills. N. Lat. 28, 10; E. Long. 95, 20.

Balsamineæ.—The best proof of M. Kunth's views particularly regarding the spurred sepal being single, is derived from the position of the stamens, the 5th which is anticous being opposite the spur. It is the posticous sepal which is wanting. Jussieu in his remarks p. 270, hints at the real nature of the two exterior petals.

Violaceæ.—From a casual examination of an Assam species common in Lat. 28 N. I think that the study of the fecundation in Viola would be very interesting. It is difficult to imagine how the pollen gets access to the stigma, since this projects beyond the cone formed by the anthers for some time before the dehiscence of these organs takes place.

Amarantaceæ. Digera has the stamens opposite the sepals. The appendages existing in the axillæ of the lateral bractea are to be considered as modified buds.

Nyctagineæ.—The stamens in Mirabilis are originally hypogynous, that is before the tube of the calyx

becomes contracted above the ovarium. The contraction acts as a ligature, and actually presses into the filaments, though to ensure fecundation the upper filaments contract adhesions with the parietes of the calyx, the lower remain in the form of 5 subulate hypogynous processes, distinctly sphacelated at the apices. These process are visible in the ripe fruit on opening the indurated base of the calyx.

Chloranthaceæ.—To this order must be referred Houttuynia, the embryo of which is enclosed in a vitellus. It agrees with the order in every respect. The anatomy of the stem is decidedly dicotyledonous or rather exogenous.

The small bractes underneath each flower have been overlooked, and likewise the fact that the terminal flower of each spike is sub 7-androus, and that it is surrounded by several, 2-3-androus male flowers. Thence Thunberg's uncertainty as to its real situation in the sexual system; which may either be, judging from the terminal flower Heptandria, or Polyandria, or with still greater propriety Monœciæ.

Piperaceæ.—The statement of the flowers of Piperaceæ being hermaphrodite admits of much doubt, some species are certainly unisexual. It is likewise to be doubted whether all naked flowers are not unisexual.

The structure of the stem of Piper is certainly exogenous; both in the woody and herbaceous stems. These last exhibit in perfection the separation or rather the existence of two distinct systems composing the wood, and their complete separation, these may be called the fibro-vascular, and the fibrous. It is a

curious fact that the fibres of the former are always punctate; while those of the latter, are not: it is these only which are truly fibrous, the former being elongated cells. These true fibres exist in Piper either in distinct fascicles when they are contiguous to the fibro-vascular, from which they are always separated by soft cellular tissue, and they are always situated towards the circumference of the stem, or they form a continuous zone close to the bark.

This, in the genus under consideration is waxy, the latter formed fibro-vascular fascicles occupying the concavities; the convexities corresponding to the green lines so conspicuously visible in many species under the cellular integuments.

Podoslemea.—From an examination of two species of Podostemon, I incline to the opinion of their being monocotyledonous, and that they are especially related to Lemna and Pistia. I have not however ascertained the existence of a foramen in the ovula, nor have I yet seen ripe seeds. From the invaribly lateral situation of the stamina, and from the presence of abortive filamentose ones on the column formed by the cohesion of the filaments, I incline to think that the flowers are monæcious. In this genus a binary arrangement is strictly followed even in the formation of the pollen. One of the most striking features in this genus is its evascularity and in each axis of inflorescence being totally distinct. *Deboro, Feb.* 18*th* 1836.

Since the above was written I have ascertained Podoslemon to be dicotyledonous, its seeds are exalbuminous and orthotropous.

Two species are found on the Khasiya Hills, both are fixed to rocks or stones and both are half immersed.

Epacrideæ.—One species is found at Singapore which can scarcely be called or placed in Polynesia.

Campanulaceæ.—In Codonopsis and Cyclocodon a curious anomaly occurs. The parallel of which is to be looked for in Barclaya, I allude to the cohesion of the tube of the corolla to the ovarium, that such is the case I take it to be proved by the consideration of a Khasiya species Cyclocodon distans, in which the calyx is totally inferior and removed to some distance, from the base of the ovarium. M. A. Decandolle has I believe described what I call the calyx of Codonopsis as an involucrum. but this view is not borne out by structure. *Deboro, Feb.* 28*th*, 1836.

Scævolea.—One species of Scævola occurs abundantly on the Tenasserim coast.

Three species occur in British Burma, between the parallels of 16,30 and 12th, Lat.

Cucurbitacea.—The anthers are one-celled at least in several of the genera. They are always extrorse.

There is no arillus, a genuine arillus is an extension of the funicle and never forms a perfectly closed sac round the seed. The "arillus" of Cucurbitacea is part of the placental tissue, it arises from the separation of the part immediately surrounding the seed, as this is its origin, it is at once evident, that it can only exist in those genera, which have the seeds immersed in the placenta. The seeds are completely naked in Actinostemma which has them pendulous

from the apex of a celled fruit. *Suddiya, Augt.* 13*th*, 1836.

Plumbaginea.—Agialities rotundifolia occurs in the Sunderbunds, and abundantly about Mergui, 12. N. Lat.

Compositæ.—Jussieu does not define his corymbiferæ so he says. "Flores vel flosculosi omnes, vel radiati." See his observation upon the class page 167.

Cichoracea.—Bellis and Carduus are both referred here from inadvertence, Carduus is Cynarocephlous according to the author himself. Sec. supra Carduus benedictus. Bellis is Corymbiferous. The author may however intend the three as instances of each section, in which case there is no mistake.

Capripoliaceæ.—Hedera has the raphe internal! the cotyledons alternate with it and are hence accumpent: They are often however more or less oblique. *July* 14*th*, 1836.

In what does it differ from Araliaceæ. I know of no instance in which stomata are more abundant than on the upper surface of the leaves of Hedera terebinthasæ?

Loranthea.—Loranthus differs from all other phænogamous plants in the entire absence of ovula until fecundation has been effected. Viscum is a little higher in the scale of development, but its ovula consist only of what I am disposed to call the albuminary coat: with this genus Santalum has especially in its placenta and ovula a good deal of relation with regard to their vegetation: the *stock* may be considered as unlimited, although it must be of a

permanent nature to ensure the maturity of the parasite: These plants are simply imbedded but there is no interchange of structure, unless in the case which not unfrequently happens of the sucker of one passing into that of an other belonging to the same plant.

Most of the accounts of the mode in which this parasitism occurs appear to be incorrect, at least most of the Indian species, are not confined to union by one spot. In these, roots are indefinitely thrown out, which contract unions with the stock indifinitely. *Deboro Mookh, Feb. 29th,* 1836.

Asclepiadeæ.—The subject of impregnation in this order has been lately cleared up and pushed to an extent certainly unequalled in any other branch of organic Natural History. Brouginiart claims the honour of having discovered this, but I am inclined to give the whole credit to Dr. Brown, especially when we take into consideration one very great error into which Mr. Brougniart has fallen, I allude to his statement of the dehiscence of the pollinias and consequent fecundation occurring in the cells of the anther. Mr. Brown has published his observations in the Linn. Soc. Transactions, in which however he had traced the tubes to, but not into, the ovula of Calatropis gigantia—and about the same time traced them to the placenta in Hoya viridiflora. Mr. Brown was the first who traced them into the ovula. He tells me that Treviranus had likewise succeeded. Wight has also succeeded in Calatropis gigantia. I have traced them to the same point in Dischidia Rafflesiana and benghalensis, part of my observations on which, I sent

to Mr. Brown in 1835.* With reference to this I claim the third place giving precedence to Mr. Brown and Treviranus; but no one but myself has hitherto traced them, I believe, in Asclepiadeous genera with erect pollinia.

I may add that Dischidia agrees exactly with the statement or description of the ovula of Asclipeas. *Deboro Mookh, Feb. 29th,* 1836.

Gentianeæ.—In Sebæa ? the pollen is simple. The testa, which is simple is made up of sinuous cells. *Feb.* 23*rd,* 1833.

With Villarsia, Parnassia has many points in common in the situation of its stigmata with respect to the placentæ, and in the want of albumen. All these discrepancies may I think be explained. *Gubro, March* 12*th,* 1836.

Myrsineæ.—It is a common character of this order to have glandular, and even pellucidly dotted leaves. So much so that a shrubby plant out of flower with such and alternate exstipulate leaves, may with tolerable safety be referred to this order.

Samydeæ which agree in the above points are we are told by Dr. Brown distinguished by the mixture of linear and pellucid dots, but Dr. Wallich tells me that the same thing occurs in some Myrsineæ. *Deboro Mookh, Feb.* 29*th,* 1836.

I have since seen the union of the two sorts of glan-

* The subject is illustrated in an unique and most invaluable set of diagrams, constructed from his own original observations by the author, for the instruction of his Pupils in the Medical College of Calcutta, and deposited in the Museum of that Institution.

dular dots in a species of Ardisiæ. *Gubro, March 13th*, 1836.

Orobancheæ.—The testa of the seeds of Æginetia indica is composed of fibrous cells. The fibres being spirally arranged. *Mergui, Oct.* 1834.

Some cells of ordinary form being mixed up with them. I should add that these fibres do not exist in the ovula before fecundation has taken place. *Deboro Mookh, Feb. 29th*, 1836.

Cyrtandraceæ.—Mr. Brown makes this a tribe of Gesnereæ, see his remarks under Aikinia. With regard to the want of albumen I find traces of it in 3 species of the order, and if as I suspect there is in Cyananthus a tendency to union between the calyx and ovary, this appears to be no objection to the union of the order with Gesnereæ.

The embryo is certainly orthotropous. *Deb. Mookh, Feb. 29th*, 1836.

Verbenaceæ.—In the whole of that section to which Congea belongs, and of which the chief peculiarity consists in the capitate flowers and involucra, the placenta is central with 4 ovula hanging from near its apex.

With respect to M. Aug. St. Hilaires assertion regarding the ovula being erect, I can only say, that Vitex has certainly pendulous ovula. Avicenneæ is in all respects as genuine a constituent of this order as many of the section to which I have above alluded, and with which in the structure of its ovarium it agrees entirely.

Verbena has the 5th sepal posterior, the 5th petal is consequently anterior and it is external in æstivation.

The pistil is easily separable into two portions. The ovula are attached to the bottom of the cells, the foramen is inferior. The carpella are anterior and posterior: thence 2 of the cells are spurious and owing as in several others of the family to external productions of the placenta. The style has two vascular bundles, at the back of either stigma it is prolonged into a tooth-like process.

In Zapania nudiflora, the ovary is two celled. The ovula before fecundation are appense, but rather inclining to pendulous. The foramen is inferior, after fecundation the upper part of the ovulum undergoes the greater change and the ovulum hence becomes erect. *Burrumpootra, April* 2*nd*, 1836,

Labiatæ.—The didynamy of some Labiatæ differs from the usual form, in the upper pair of stamens being the longer. See the Mergui species of Ocymoidea described in the appendix of this volume. Salvia verbenacea has some what, the structure of Collomia. That is immersed in water abundance of spiral fibres make their appearance.

This fact I had ascertained in England certainly in 1831. It has since been mentioned as a new discovery in the Reports of the British Association. *Deboro Mookh, Feb.* 29*th*, 1836.

The style has two vascular fascicles, and at least in Anisomeles nearly the whole superior surface of the lobes of style so that the foramen is turned away towards the circumference, the stigmatic tissue is divided at the base of the style into four bundles one of which passes off to each ovarium. The

situation of the raphe is however in Boragineæ Cynanchum and Myosotes apparently reversed, the foramen being turned inwards, and pointing to the base of the style. But this instead of being an exception is a remarkably strong proof in favour of the universality of the law directing the situation of the raphe since in Cynanchum in which the ovaria subsequently become straight, the raphe is at length next the axis and almost, in all those in which the ovaria remain inverted; there is a similar tendency shewn by the radicle becoming superior, apex of the lobes of the style stigmatic, in Gomphostemma the raphe is next the axis.

Boragineæ.—In an Assamese genus nearly allied to Cynoglossum, the radicle is inferior. In another it is towards the situation of the foramen, which in all is inferior and on the inner side of the funicle, it undergoes no change. In all, the foramen communicates directly with this stigmatic tissue which forms the bulk of the style and is expanded at its base.

The umbilicus of Myosotis owes its origin to the channel of this communication becoming osseous and not being filled up. In the genus referred to above this is not the case and the umbilicus is a growth of the ovulum totally unconnected with fecundation. *Burrampooter, March* 31*st*, 1836.

Heliotropiæ.—Heliotropium peruvianum ovula.

Apparently reduced as in Asclepiade to one substance.

One species is common on sand banks in the river at Mergui and answers the same purpose which arun-

do arenaria and carex arenaria serve in Europe, and which might therefore be useful in binding artificial embankments

Gymnospermæ.—The pitted tissue is I believe not peculiar to Coniferæ, it occurs in Bucklandiæ and Sedgewikia and probably in all other Hamamelidiæ. *Deb. Mookh, Feb. 29th,* 1836.

Mr. Solly tells me that coniferous punctuation are likewise said to exist in Winteraceæ. June 29th, 1836.

Cycadeæ.—The trunk is in Cycas circinalis generally dichotomously branched. The same occurs in the Gowahatty species which is probably distinct. The second integument of the ovule is united to the outer, and so is the lower half of the nucleus to the corresponding portion of this. The margins of the foramen is callous and lucid: but no change, is effected by it on the pollen, which finds its way unchanged into a canal existing in the apex of the nucleus, and within which they emit tubes.

Too much stress has been, I think, laid upon the resemblance in the vessels so much insisted on by Brongniart, Mr. brown has remarked, that the natural state of Cycadeæ is to have many embryos. Judging, I suppose from the presence of the sacs existing in apex of the albumen, in this view he is as usual correct, it is a curious, fact that in Cycas circinalis and in the Assam species the alternate tessellations caused by the foliation and floration of distinct years is lost sight of in the undivided base of the trunk.

Within the albuminary membrane, and in the gelatinous fluid that it contains, the origin of cellular

tissue will perhaps by close observation be ascertained. This fluid abounds in active molecules.

Coniferæ.—Mr. Brown is certainly correct in stating Gnetum to have naked ovula: but here I think excepting its punctuations, the resemblance or affinity ceases, the nucleus has as I have shewn three coatings, but only at a certain period of its development. The use of this additional coat, the apperance of which is sudden, is evidently to ensure fecundation, still from the comparative rarity of development of the embryo this process is evidently but seldom or at least only under particular circumstances perfected.

Butomeæ.—Butomus pygmæus occurs abundantly in India from plains up to a height 2000ft. at least on the Khasiya hills.

Stomata exist on both sides of the leaf, the ovulum is anatropous, but the mature seeds closely resemble campulitropous. The embryonary sac although highly developed and apparently membranous presents traces of cellularity.

Burmanniæ,—Several species are so to say, aphyllous and such are very probably parasitical. From some observations on the structure of the seeds, I am led to conclude that the nucleus consist of several grumous masses, enclosed within a proper membrane I have not been able to ascertain the existence of any determinate form of embryo.

Orchideæ.—The filaments are adnate to the style.

With regards to the mode in which impregnation is stated to take place, I hope that certain distinguished botanists may change their ideas, which certainly are,

considering the thorough exposition of the true mode by Brown, unphilosophical. And according to the author's expressions how can the process be effected in those which have no gland whatever, the fact of the rare occurrence of fecundation in those genera which present great difficulties to its being effected, is at once an argument in favor of the gland, being a mere organ for favoring the removal of the pollinia. No great stress is ever to be laid on solitary characters, hence both Lindley and Bauer are wrong in placing so much reliance on the perforation of the pouches of Ophrys: the existence of which Mr. Brown appears to deny, additional proofs of fecundation occurring in the usual way have presented themselves to me in two genera in which from the imperfection of the lower wall of the clinandrium the masses are absolutely in contact with the stigma. In these as might be expected, this process was effectual and nearly universal.

Regarding their views as to the origin of the gland, and its nature, in addition to the proofs adduced by Brown of its being a portion of the stigma. I may say, that when no rostellum is formed, there is no gland. This is completely proved by the metamorphosis or rather deformity of a species of Goodyera, in which there is not a trace either of a rostellum or gland. But to insure fecundation a curious change of place occurred in the stigma, which instead of occupying the anticous face of the columna, had become posticous, occupying in fact the situation of the clinandrium.

Junceæ.—In an Assam species of Juncus agreeing remarkably well with the character of J. prismatæ carpus *Br. Pr. Ed. Nees*, 115. The flowers are imbracteate and the pollen ternarily compound. The ovaria are unilocular. This affords the second instance I know of, in which the secondine is exserted in the nearly ripe seeds. This membrane in the ovulum after fecundation, adheres to the apex of the nucleus, another unusual circumstance. The carpellary leaves alternate with the stamens, and as these are three, they are opposite to the inner sepals.

Aroideæ.—Ambrosinia of Roxb. Crytocoryne of Fischer is remarkable for the structure of its anthers and embryo, the plumula of which is excessively developed. The development depending on the total separation of the cotyledon, as it were, by amputation, towards the maturity of the seed.

Pistiaceæ.—The organisation of Pistia is by no means simple, nor are the stem and leaves confounded; on the contrary, it has a distinct although depressed axis, highly developed leaves, but wanting stomata, and the spathes are distinctly pedunculate. In the scale of development it is far higher than Lemna: but inferior to it in having no stomata, superior in all other points, especially in *possessing spiral vessels.* Its cavities with cellular puncles are highly developed. Embryo at the apex of the albumen obovate, *solid.*

Equisetaceæ.—The affinity of this order, so far as the organs of fructification go, is with Marchantia. The four filaments are nothing but 2 elaters which adhere by their middles with the reproductive globule.

Without having been able to trace their formation to the requisite early period, I think it will be found that the sporules are formed with the cells of the endothecum which have spiral fibres. It is by the separation of these with the sporule that the appearance of 4 filaments arises.

The confervoid mass was, in the only species in which I have met with it, of considerable size, and always inequilateral. The first sheath has no stomata. The others have, they occupy the fundi of depressions, and are arranged linearily on either side of the angles, which are opposite to the teeth of the sheaths. Their component cells present the peculiar appearance of transverse bars. The sheaths are not separable from the axis except the lower one, and the apices of the rest.

Musci.—That the disk-like bodies produce, or are capable of producing young plants, as urged by some Botanists, is no proof that they originated from the male sacs.

No one can doubt, that impregnation is effected in this family, the constantly simultaneous appearance and dehiscence of the anthers at the time when the pistilla are formed, the constant sphacelation of the style, and the subsequent evolution of the nucleus or nucleary vesicle contained in the pistilla (or at least in that which produces the seta) are so much in common with the ordinary route of fecundation, that it is scarcely possible to believe, but that an analogous method is resorted. Here I may mention another fact of some importance, although occurring in Hepaticæ,

which is, that, in Anthoceros in which the evolution of the sporules is carried on in succession, or for a considerable period, after those first formed are matured, and have escaped; steps are taken to ensure a similar gradual succession of the male organs. The obvious difference is the apparent effect of the process in forming the seta analogous to the formation of pollen in some Aroidea and theca, not being limited as in Phanerogamæ to the evolution alone of the reproductive sporules or seeds. On these points Valentine has read a paper before the Linn Society, containing new views, and pointing out abundance of facts hitherto entirely overlooked by Cryptogamists; the anthers have no affinity of structure whatever with gemmæ. This is particularly observable in Hepaticæ.

Hepaticæ.—The common structure of the order is to have an original theca resembling much, that which is called the calyptra of mosses, and indeed differing only in never being torn up from its attachment. The only exception, I know of, to this occurs in Anthoceros, which appears not to have an original capsule, and consequently no calyptra. That which has been called a calyptra being nothing but a mass of tissue dislocated by the growth of the theca, I think also that Marchantia can have no calyptra, with regard to the secondary thecæ, they certainly present great differences; their place is supplied in Riccia by the original theca; are anomaly perhaps dependent on the immersion of the theca in the frond itself.

I have no more doubt about the impregnation of this order, than of mosses. The anthers of Anthoceros regularly dehisce at their apices, and discharge the mi-

nute granular matter, they contain a structure totally irreconcileable with the idea of their being gemmæ. The remains of these sacs may be always found in the cavities in which they are formed, and from which they cannot escape. This is the more remarkable as in Riccia the fruit always becomes exserted. I look upon the existence of the elaters as similar with that of fibrous cells of the endothecum ; and I attach consequently very little importance to their existence.

The direction of growth consequent on fecundation is directly opposite to that of mosses, Marchantia and Targionia are remarkable for their stomata. The existence of which evidently depends upon their being furnished with a cuticle. This in Riccia is exceedingly rudimentary.

Characeæ.—Much light has been lately thrown on these obscure plants, particularly as regards their circulation by Varley, Solly and Slack.

The nucule is really monospermous.

Remarks on Ovula

An ovulum is, at its earliest period of existence an extension from some part of the surface of the placenta, it is at this time rounded sessile, entirely cellular, and without the slightest trace of any integuments. The first change that takes place is its separation to a greater or less extent from the placenta by the elongation of portion of this last, forming the funiculus, the next change is the marking out of its subsequent coat or coats by one or generally two lines of construction, the uppermost of which is however first formed, when two of these lines are formed, the ovulum is di-

vided into three parts, the uppermost which is generally conical and more transparent is the nucleus, the first developed portion, that which is contained between the two lines forms afterwards the second integument, the remainder of the base forming the outer coat or testa. But while these boundaries are being marked out, secondary changes may or may not be going on when the former is the case, it consists of a sort of inversion in direction of the ovule, by which the apex of the nucleus is brought towards the point of existence of the funicle from the placenta. The next step is the production upwards of the ring marked out between the two lines of construction, or one line only is formed by the production of the part immediately contiguous to the line, a ring is thus formed which embraces the base of the nucleus, shortly afterwards that which becomes the outer coat is similarly extended round the base of the second coat.

Both these continue to elongate, but the inner coat maintains for some time the ascendency and at length entirely encloses the nucleus, beyond which it is generally continued into a neck variable in length, always open and generally somewhat dilated at its extremity.

The outer coat by its gradual extension at length likewise entirely encloses the nucleus, and the body of the inner integument, it frequently encloses the whole of this, while often before fecundation and for some time after the neck of this last projects to a considerable distance.*

* No one has enquired, how the base of the ovula is extended downwards, or how the base of the second coat extends downwards into the substance of the outer, does it or does it not?

Throughout the above period the nucleus has gone on increasing in size, but at the time of fecundation, it is invariably enclosed and concealed by both coats when the two exist. But it undergoes no further change for some period.

An ovulum at the time of fecundation will generally be found to consist of an outer coat open at its true apex, the opening varying in size, but always less than the diameter of the ovula; an inner cellular coat, generally thinner than the outer, prolonged beyond the nucleus into a hollow neck, the apex of which is open and more or less dilated, either (and perhaps generally,) about on a level with the opening of the outer coat, or projecting beyond it to a variable distance; and a central cellular body the nucleus, generally ovate, its apex being more laxly cellular than the remainder, and occasionally projecting into the neck of the inner or when this does not exist of the outer integument and in this case very much resembling a coat itself. At this period the ovula may be entirely cellular or it may be partly supplied with vessels, but I shall refer to this more fully when I speak of the raphe. The nucleus will at this period almost always be found to have a central discolored nucellus, or frequently an excavated cavity of varying dimensions. The above discoloration or rather opacity is invariably the precursor of the cavity that is about to be formed, and indicates the situation as well as the direction in which it will be formed. This cavity is always ? formed from below upwards.

All the subsequent changes at least those of any importance, are carried on within the nucleus. They

consist first of an extension of the cavity abovementioned, until with the exception of some few cases hereafter to be specified, this originally cellular thick solid body, is reduced to a thin coating, or even and not unfrequently reduced to nothing.

It will be seen that not one of these phenomena depend upon the completion of fecundation, nor in fact does any one, excepting the all important formation of the embryo, depend upon the due performance of this function.

The 4th change consists in the production of a membrane within the cavity already formed in the nucleus. To this sac, I attach very great importance, and I consequently shall be full in my details.

(*Compositæ*) whatever its nature may be, it appears to be always? formed from above downwards, that it is developed from the apex of the nucleary cavity: when completely developed, it invariably communicates with both apex and base of the excavation, the diameter being either uniform throughout, or larger at its apex, dividing by inferiorly into a thread of communication.

I know of no instance of the absence of this sac, of which from the consideration of Viscum and Santalum, I consider the only essential part of the ovula, preexistent to the embryo.

There are two curious modifications of this integument, and of great importance to study, and although the origin is in both cases the same, yet the growth is materially different, in the one, the albuminary form, consisting of the simple extension of a single cell, in the other, the exalbuminary form, of the growth of

additional distinct cellules from the surface of the original simple one. To the existence of the first modification, I find the presence of albumen invariably attached, so much so that in describing ovula, I would say with confidence whether the seeds would be albuminous or not. Even in those cases in which no opportunities have occurred of examining it aborgine, inspection of the margin of the sac will always settle the point, even although the whole of its inner surface may be occupied by cells, the rudiments of the future albumen.

The only instances in which albumen exists without this membranous sac is in those few cases in which that substance is deposited in the body of the nucleus, and the embryo is developed within a distinct sac (vitellus) which is always of the exalbumenary or membrano-cellular type.

In the exalbumenary form which in my descriptions. I term membrano-cellular in contradistinction to membranous, by which I characterize the albuminary form, the surface is even at a very early period distinctly cellular. This form may be seen to perfection in Compositæ.

Whatever its nature may be, as it invariably has important relations with the embryo, and as this is invariably formed within it, I propose calling it the embryonary sac.

Another important feature of this sac is its indestructibility, it always forms portion of the seed, although in the albumenary form, it occasionally becomes so identified with the albumen of the periphery,

that it is difficult to trace its existence. In the second modification its existence in the seed is always distinct, ex Composita, and Boragineæ.

The last stage in the development and the only one dependent upon fecundation, is the production of the embryo. This invariably consists in the appearance of a cell attached by a slight cellular pedicel to the apex of the embryonary sac, it is developed by the production of other additional cellules, which always contain much active molecular matter but less than the albumen. It soon becomes densely cellular in dicotyledons, the cotyledonary division is soon indicated, but the radicle is necessarily, from what I have just mentioned, the first part formed. With regard to the direction of the cotyledons, I have not as yet ascertained any law, they are often opposite to the true faces of the seed and often alternate. Embryos are generally axile when albumen is present, in those cases in which they are subsequently peripherial, this is owing to an equal deposition or formation of the albumen.

The albumen is of a comparatively early development, and when it exists is always partly formed before the embryo begins to appear, I find that with the exception of those cases in which the embryo is lodged within a vitellus that it it is never formed within the nucleus.

In its earlier stages, it contains myriads of active molecules of a regular size, these molecules form in fact the milk of the albumen.

The presence of albumen is the test of an imperfect

embryonary evolution, or certainly of imperfect germinating powers, this though liable to some exceptions appears true enough; it explains why* albumen is so common among monocotyledones. Its presence is incompatible with the existence of a highly developed, plumula, a remarkable fact, and one particularly evident in some Aroidea which contrary to the habit of the order, have no albumen, the deficiency being supplied by a high degree of development of the Plumule.

The next point to be enquired into, is the relative duration of these coats, which are almost invariably 4 in number. The only instance, I as yet know of to the contrary occurring in Xanthium, in which there is a membranous sac, of excessive tenuity which lines the embryonary sac. These four coats the existence of which is possible are, the outer and inner integuments, the nucleary membrana, and the embryonary sac; of these the 1st is always permanent, remaining in the shape of the testa, as is likewise the embryonary sac. Traces of the two others are frequently imperceptible, and it may be expressed as a general rule, that the inner integument of the ovulum has no existence in the seed. This is well expressed by Dr. Lindley in his Introduction to Botany, p 184.

The nucleary membrane frequently exists, it is known from either of the preceding by being imper-

* Note—Mr. Brown long ago remarked, that albumen was the type of Monocotyledons, but no one has I believe remarked, that the proportions in favor of albumen among Dicot. Monopet. are nearly equal to those of Monocotyledons.

forate. On this point, Dr. Lindley has the following remarks. This third coat is formed by the proper membrane or cuticle of the nucleus from whose substance in the unimpregnated ovulum, it is never, I believe separable, &c. &c.

There is no positive mark by which the embryonary sac may be characterised as it is likewise imperforate. But its immediate contiguity to the embryo will in all exalbumenous seeds at once decide its nature: traces of its original attachment are likewise often visible at one of its extremities. The component cells in compositа have a grumous nucleus.

I may here observe, that the seeds of this extensive family are not, at least in a great number of instances, akenia. In almost all I have exmained. The outer tegument adheres to the cavity of the pericarpium, and in all separates with it. It is the embryonary sac that invests the embryo and separates with it. In albuminous seeds, as I have mentioned the existence of the embryonary sac is difficult to trace, this is owing to its having become incorporate as it were with the albumen. In others again its existence in the ripe seed is very distinct, enveloping the albumen in the shape of a hyaline membrane.

Various additions may take place on either surface of the outer integument, hence the number of coats is frequently apparently increased. M. Mirbel was the first to point this out.

With regard to the vascular supplies of the seed, I may remark that a sufficient number of observations, have not been made on the exact period of

the first extention of the vessels of the placenta into the ovulum. It is a general law that every part of a vegetable is aborigine cellular, the existence of a vascular system or of any system analogous to it in function being called into play at a subsequent period, and being a test in every sense of the word of complete evolution. Instances are not wanting where the seeds are certainly evascular, in others, the absence of vessels is supplied by elongated tissue. The vascular system of ovula is seldom, perhaps never complete until aften fecundation, and it is very provable that the drawings which represent in such cases a distinct raphe are erroneous. It is most complete in those ovula in which the inversion above mentioned has taken place, the ovules anatropes of M. Mirbel. In most instances in which a vascular system does exist a direct communication is effected between the placenta and the base of the nucleous, around which in some instances the ultimate vessels in some radiate. It hence follows, that a raphe is not limited to the anatropous form of ovula, neither are the vessels confined to the testa, although it is an indisputable fact to which however I know of one exception ? that the second integument (scarcely as it is not the second but probably the embryonary sac which is vascular) is, with the exception of that part of the base, perforated by the vessels in their course to the base of the nucleus, certainly cellular.

In those instances in which the base of the nucleous and of the integuments correspond with the

hilum it is often very short, its parts will of course depend on the distance between the above points.

The Raphe either consists of spiral vessels and ducts, or of ducts alone, and in some cases of elongated tissue. In the generality of instances, it terminates opposite the apex of the cotylidons, forming the chalayza, in some it becomes at this point bipartite, the divisions terminal towards either side of the true apex of the seed, as in Carya and some Boragineæ. In others it is continued unbranched terminating in, or towards the outer margin of the originally conspicuous foramen, as in many Compositæ and Stylidium.

Its situation may be regarded as universally next the ventral suture of the ovaria, or next the axis. For this important fact, we are indebted to Mr. Brown, who has likewise proved that all exceptions to this are only apparent, and originate in a torsion of the funicle subsequently to fecundation. The same distinguished author has brought this into play as a distinguishing character, and has pointed out, that true Loniceræ may be at once distinguished from their allies by the reversion of the situation of the raphe. In this point of view it is useful, as proving that in Boragineæ, the ovaria are inverted, while in Labiatæ they are erect. In Coriaria it is dorsal, at least in one species from the Abor hills; but I am at present unable to say, whether this arises from a twisting of the funicle or not.

In polycarpous ovaria, however there does not seem any fixed situation for the raphe. Thus in Legumi-

nosæ the foramen is uppermost and the raphe consequently lowermost; this was first pointed out to me by Mr. Brown, who immediately detected, that in my drawing of Humboldtia published in Dr. Wallich's Pl. Asiat. Rariores, I had reversed the situation. The same occurs in Asclepiadeæ and Scrophularineæ, and probably in most cases. In others again the foramen or raphal surface is lowermost, and in Henslovia it is indifferently lowermost or uppermost.

In some instances in which the nucleus coheres intimately with the outer integument, it seems to run rather between the two than in the integument, this is very evident on making a transverse section of the ovula of some Compositæ.

There is no appreciable difference of any importance between the development of the ovula in the two great divisions of Phænogamæ, excepting so far as the embryo is concerned. In both, the first steps in formation of this are the same. The same may be said of the Gymnospermous division of Dicotyledons, so far as I can judge from Cycadeæ and Gnetaceæ, the only two orders I have had an opportunity of examining it in.

I object to M. Mirbels' names which are founded on Numerical considerations; because in the first place, the precise number of coats is not always developed, and one cannot well call a coat the quartine when it is only the third. The names founded either on the parts from which they originate, or especially on physiological points, carry a certain amount of information with them, hence for the tercine I propose, that of nucleary membrane, and for the quartine I adopt M. Brong

nearly name, sac of the embryo, which is excellent in every rcspect. I am not acquainted with M. Mirbels' quartine; and I think it will be found that it is the embryonary sac, as well as his quintine.

It follows that the liquor amnios is never enclosed in the nucleus, it always exists in the early periods of the development of the sac of the embryo, and is certainly either the rudiments of albumen, or in exalbuminous seeds, of cellular tissue, which, by the subsequent enlargement of the embryo is pushed back and at length absorbed.

To repeat it, in all ovula no more coats than 4 exists. In Piperaceæ, etc. in which an additional coat is supposed to be formed, it is merely the embronary sac.

The principal simple modifications of stigmata may be stated as follows:

1. Production of the midrib beyond the terminal sinus analogus to a mucronate leaf, it is evident that this may be carried to such an extent as to reduce the stigmatic surfaces to a mere point at the apparent base of the style.
2. Production of the stigmatic base beyond terminal sinus forming a bilobed stigma, the branches of this must be on the same place.
3. Obliteration of the terminal sinus, constituting an uniform stigma.
4. Obliteration of the inferior sinus.

I am not aware of any instance in which the stigma of a simple carpellary leaf is capitate, one sinus is always existing. There is however, on the principle, that both sinuses may be confluent, no theoretical

objection to the existence of such a form, although it would be reasonable to expect, that the axis of such a stigma would not correspond with the axis of the style.

Comparatively sudden reduction from a broad to a narrow surface is not uncommon in leaves, all apiculate or cuspidate leaves are instances, and of these, none can be more striking than that of the peepul.

But though a continuation of the placenta along either margin to the commencement of the apex of the midrib, would constitute the simplest form of stigma, yet it is still necessary to allow either an increase of the margins, or a spreading out of the stigmatic surface over the narrow part of the cauda or apiculus to explain those stigmatic lines which occupy the whole inner face of the style, excepting perhaps the midrib itself, such for instance as Escholtzia.

Stigmata are continuations upwards of the placentæ, they are consequently double, and have the same relation to the leaf as the placentæ.

There is perhaps scarcely a modification in the form of leaf, which may not be met with in an extensive examination of carpellary leaves.

Thus such instances of bilobed styles as occur in Iris, Meyenia etc., are representations of an emarginated bifid, or bilobed leaf, the true apex of the one is pointed out by the apex of the midrib, which is undivided, in the other by a protuberance, or when this is not evident by the termination of the central vascular bundle.

Bauhinia may be capable of explanation in three

ways, it is a simple bilobed leaf, or it is an abruptly pinnate bifoliate leaf, the leaves cohering by their inner margins, or it is a pinnate leaf, reduced to the two basal leaflets cohering with the costa of the pinna, this last is deserving of little consideration.

If it is a simple leaf, the midrib of the leaf as it exists should be the largest vascular fascicle, and all the other veins should be more or less lateral.

If an abruptly pinnate bifoliate leaf, cohering by the inner margin, the midrib will probably be the smallest, one midribs will exist for each lobe, and a macronulus may be found terminating it: none may be found terminating the line of union.

To distinguish this from the third supposition, the line of union would probably be the most marked vascular fascicle of all, a mucronulus would exist, lateral mucronuli might exist, and each lobe would have a central and largest vein.

I believe the first is the correct explanation, if so, the division or lobation may be carried nearly to the apex of the petiole, and this would be analogous strictly, for a mucro always exists,—instance Labiatæ and Borragineæ.

I can also cite in reference to the similarity of modification between leaves and carpellary leaves, such instances as Arum pertusum and Leonitice.

M. Decandolles' hypothetical explanation of the degrees of division of leaves appears to me to rest upon very inefficient causes, one of which is easily disproved, because the degree of lobation ought to correspond with the distance between the primary veins.

This is only one of many instances of an attempt to reduce effects to causes.

We cannot explain every thing, in the present state of knowledge it is indispensable that effects should be referred to causes only when there is a manifest and a steady relation between two points of structure, which may be made to enter into the explanation.

To pressure for instance, many things are ascribed which are not due to it, and many things both our ignorance and knowledge are interested in ascribing to unknown causes.

A confession of ignorance cannot lead to error, while a subtle hypothesis especially by an eminent Savant may not only be false, but is very apt to check enquiry, from the assumption of knowledge contained in it.

NOTULÆ AD PLANTAS ASIATICAS.

PART IV.

Exogenous Plants.

CYCADACEÆ.

CYCAS.

The species of this genus, with the exception of C. revoluta, are difficult to discriminate, so much so that the study of living plants at different stages is quite necessary to fix their differences. In habit and foliation, no practic. marks are to be discovered, these appearing to be limited to the shape of the carpel leaf, especially the dilated apex, and to the figure of the fruit.

The anomaly of the upper part of the carpel leaf being broader than the rest: what does it indicate?

C. dilatata. The distinctions are very difficult, few if any practical ones can be taken from the leaves. I would derive them from the carpel leaves, particularly the lamina and its mode of division, the shape of the anther scales, the shape of the fruit, and the line of their points described by the leaves.

C. sphærica; fol. carpel. spith., parte nud. 6-uncialib. 3 ovulig., apice lanceolato-acuminatis e basin subulato-dentatis, conico-subalato dente squam. apiculo curvato æquant. fruct sphærica.

C. circinalis: apice squam. autem brevior subito. fol. carpel min. versus dist. ovulig. lamina subspath. a medio supra dentato-serrat. acumenato-subulat.

C. revoluta tot fol. carpel. gris toment., apice oblongis dilat. digitato-divisus, fruct. oblongo-rotund. villoso-pubescent.

Cycas.

External characters.

The trunk is simple, subexannulate, smooth in the lower and older parts, with the exception of irregular longitudinal fissures in the cuticle. In the later formed parts it is covered with the scars of the leaves, which scars of the leaves are arranged in indistinct annuli, the intermediate spaces being occupied by the remains of former inflorescences.

No stress is to be laid on the annuli, which are by no means universal, and which when present, are very obsolete. The trunk is proliferous, each year producing 2 close rows of leaves and terminal inflorescence, which necessarily becomes pushed out by the succeeding formation of leaves. These annuli may be traced from 5 to 7 formations, all traces of the scars of the leaves becoming lost after that time,

Dimensions: Erect, trunk 4 feet high, about a foot and half from its base, the circumference is $19\frac{1}{2}$ inches, and the diameter $5\frac{8}{10}$ inches; across the last formed annulus $20\frac{1}{2}$ inches: that of a trunk, 9 or 10 feet in length, (which was prostrate for about $\frac{2}{3}$ of its length, the inferior portion of the prostrate part had sent out several strong roots,) 1 foot from the crown of leaves 16 inches, around the last distinct annulus 15 inches, at the base of the erect part, the diameter $5\frac{1}{4}$. There is no distinction of bark, the great substance of the axis being composed of white dense cellular tissue.

The axis is occupied by pith of enormous dimensions, of close white cellular tissue; adjoining this, is a broad zone of fibrous wood of a yellowish brown colour. These zones vary in number from 2 to 3, and vary likewise in this, that they are close together, and are separated by white fibrous tissue.

The space between the outer zone which is small, and the cuticle is occupied by cellular tissue, white and dense, in

which are interspersed many very irregular bundles of woody matter. The pith is altogether similar to this portion; opposite each annulus or formation of leaves it is traversed by vessels.

Each formation of wood is connected by ligneous facicles passing between each other. The inner woody formation is continuous, diminishing exceedingly at the apex of the trunk.

It is obvious from the small number of concentric circles compared with the formations of leaves, that these do not correspond, or rather that more than the wood of one formation of leaves enters into the composition of each circle.

In the prostrate trunk, the development of the wood was carried to excess on the decumbent side, on the opposite one there were three formations, the outer of which on reaching the commencement of the excentricity appeared to divide into 2. On this side 7 distinct formations may be counted, the last being exceedingly irregular from the woody matter passed freely into the roots.

No great knowledge of the structure of these remarkable parts will be attainable, but by close observation of all stages intermediate between that of the 1st development of the stem and its subsequent maturity. It is obvious that the woody matter is deposited in cones.

Connected with this excentricity there was no deviation in the regularity of the corona.

This is obvious if there are 3 zones in the lower, 2 in the centre, and one only at the apex. It is essentially exogenous, the latest fibres developed by the terminal, being always outermost: Dr. Mohls' statement appears to me to have nothing here to corroborate it.

Mr. Brongniant's opinion that the layers are not to be considered as analogous to the same number of layers of dicotyledonous wood, is also incorrect. What the relations are which these have with the epochs of inflorescence and foliation can only be cleared up, as he observes, by the examina-

tion of numerous individuals of different ages and different species. In all probability had he examined sections nearer the base of the axis, he would have found one or more additional layers,

In the fruit (Pl. CCCLXI. Fig. I.) which is of the shape and about the size of a hen's egg, the base of the papilla is still distinct, its mouth or canal being filled with whitish tissue, the rest being obliterated but still traceable by its brown colour. The nucleus has become osseous woody, and has lost its conoid shape, its apiculus is very small and bony. The next envelope is membranous with a flocculent rough surface, it is open at the summit, towards its base it is very thick and fungous. It adheres to the immediate envelope except at its apex. The immediate envelope is very thin, of a brownish colour, its apex is coniform and sphacelated, it corresponds to the centre of the perforation of the last envelope. The albumen is about the size of a pullet's egg, flattened at its base, there is a transverse irregular depression at its apex, it is heavy and fleshy.

In the more advanced fruit the quartine is separable from the tercine which has now become entirely fungous. The depression of the albumen is marked by 5 or 6 spots, which indicate the apices of so many cæca, which are either filled with mucilaginous fluid, or contain peculiar cellular bodies? With the exception of the cavities in which these sacs are lodged, the mass is entire and homogeneous.

The tardy development of the embryo is very remarkable. In the fruits I have examined some of which have been larger than duck's eggs, no trace of it has been visible. Mr. Brown first noticed the spots on the depressed surface of the albumen, and their correspondence with so many cavities containing sacs, which again contain a clear mucilaginous fluid, according to him they disappear, with the exception of one in which the embryo is developed. In the ovules there is some similarity with those of Gnetaceæ, the coats are however only four, no additional one being formed. The

chief difference is the adhesion of the secundine with the primine.

a. Second or drupaceous coat.
b. Third or fungous ditto.
c. Fourth or Neucleary ditto,
d. Outer coat.
e. Sac outer coat.
f. Albumen.
g, *h*. Central body its, depressed apex.
i. Transverse section of the apex of the albumen.*

In Cycas circinalis the ovuliferous leaves are of considerable thickness, flattened above, convexed beneath, and dilated towards the apices, the immediate apex being prolonged into an acumen. The upper half of the apex is deeply and sharply toothed, the ovules are arranged in cavities below the apex along with the margins, and more or less alternately. It is obvious that this arrangement would, if the margins of the leaves were produced inwards, produce a carpellum of normal male structure. The upper surface of the apex is invariably more or less smooth, the pubescence gradually disappearing as we proceed upwards, the immediate apex of the acumen is smooth, and corresponds to the stigmata of other plants, that is, when these are usually alternate with the placentæ.

The ovula are roundish, contained in the cup-shaped cavity, flattened obliquely above this, from right to left. They may be said to be obcordate; a papilla occupies the centre of the sinus. This papilla is short, cylindrical, truncate and open at the apex, the margins of the opening being somewhat thickened and shining, but apparently destitute of secretion. Their colour is polished greenish yellow and covered more or less with minute glaucido. A transverse

* Cycas perhaps is the most marked instance of perfection of mere fruit with fecundation, all the parts to the albumen being perfectly formed, and in abundance, for in C. pectinatus, apparently perfect specimens occur, all without embryos, the male being according to Major. Jenkins' exceedingly rare.

section discloses the following arrangement, a very thick coat, evidently and structurally divisible into two, the outer is thicker, having a distinct and thickish cutis, the remainder consisting of close parenchyma, of a green colour, and pierced with numerous irregularly disposed cavities which contain the mucilaginous matter, in which Cycadeæ so much abound, and which are analogous to the cavities in the outer coat of Gnetum, which are occupied by fibres of very large diameter. This coat or rather the outer part of it, is the primine. The inner portion is composed entirely of whitish dense tissue. This is the secundine, the vascular system consists of two fasciculi which occupy the inner part of the outer portion of tegument, running from base to apex.

The tissue of the secundine on a line with these fasciculi and between them, and the inner margin of the cavity in which the nucleus is contained, is arranged longitudinally. This portion of the coat is evascular, another reason for considering it to be primine. The central cavity is round, of considerable size and is occupied by a coniform fleshy cellular body, the cells being dense externally, rather lax internally, no vessels are traceable into this portion. The immediate centre is, if the section be made towards the apex, occupied by an opaque body.

June 8th, 1835.

1. *Cycas circinalis*. Pl. CCCLXI. Fig. II.

1. Female flower and portion of frond.
2. Ditto separated.
3. Ditto long section.
4. Ditto outer coats partially removed, shewing the free cone of the nucleus.
5. Ditto base of the nucleus and outer coats remaining, shewing the quartine of a globuler form.
6. Quartine separated.
7. Portion of cellular pulp filling its cavity. At this stage

the two envelopes are altogether united, the papilliform process of the primine is open; from its mouth a canal proceeds, which widens as it descends into a large cavity in which the cone of the nucleus is included, the apex of this is not exserted but terminates a little above the widening of the canal. The cone is solid, the base of the nucleus is occupied by a large globular cavity in which the sac of the quartine is contained. This sac is perfectly shut, and has no communication with the wall of the cavity of the nucleus. It is easily detached, is of a globular form and is filled with pulp, consisting of very lax, slightly angular cellular tissue of a perfectly homogeneous nature.

8. Ovule further advanced, the papilla of the primine has fallen off, and the canal is obliterated. No other change has taken place except in size.

It does not seem to me to come within the bounds of what we know of general structure, to reduce the male organs of Cycas to the type of an ordinary anther.*

Either each scale is to be considered as an anther, or each polliniferous bag is to be so considered.

All analogy is against the former, for no instance is known of the cells being distinct organs projecting beyond the surface. Though pluri-locular anthers are known; yet the cells are contained in the general substance of the anther, and at one period at least contained within its common covering or surface of that organ.

The ordinary type of an anther is 4-locular, the pollen is a separation or modification of the cellular tissue equally on both sides of the mesial line of the *leaf*: no instance is known in which the whole substance of the anther is so modified, except perhaps in Sarcophyte, but a part remains solid and unchanged as connectivum. Now in Cycas each polliniferous bag is a distinct organ, and the pollen is the entire modified cellular internal substance.

* No analogy between anther cells of Cycas and Phænogs.

There is no instance known in fact of an anther of 2-5 cells, each quite distinct from the other, and opening along their mutual inner surfaces.

But this aggregation, relation, degree and mode of dehiscence, together with the situation on the under side of the leaf, from which they are exclusively derived, are all points common to the reproductive (spores) of certain Cryptogams.

The first stage of development of the pollen observed, when the scales were—long—broad.

The pollen cells at this time are perfectly formed: those along the central line being the largest: they present faint traces of the line of subsequent opening. The cavity which is undivided, is one occupied by a loose mucilagino-cellular mass which is resolvable into angular grumous bodies, without distinct membrane, each presenting a cytoblast, or as I think, a point of commencement of the membrane. The development is, I think centripetal, *i. e.* the cells of the periphery are the most distinct.

There are also some remarkable points in the structure of the ovulum. The nucleus of the vegetable ovulum is always solid, up to the period of its being penetrated by the pollen-tube, it is homogeneous up to the period of the appearance of the embryo-sac. But in Cycus the conical apex is not solid, nor can it be said to be homogeneous, for it contains a conical cavity with a fundus presenting a central elevation, and its apex is produced into a cellular membrane which lines the canal of the foramen, and I believe adheres to it at its apex.

Then again when there is more than one appearance of embryo-sac,* their development is synchronous, but in Cycas

* They are not embryo-sacs. Embryo sacs do not exist for a long time after the enlargement of the fruit if there be no fecundation.

The appearances of the funicle of the ripe embryo is analogous to Loranthus.

What are the above sacs, which at any rate are developments of no

up to a late period, only one is to be found, containing homogeneous solid cellular tissue.

2. *Cycas Jenkinsiana*, Gr. Pls., CCCLX. Figs. 1, 2. CCCLXII. Fig. 1.

Trunk, often branched, sometimes 3 feet in diameter: in the specimen about 5 inches in diameter, marked externally with the persistent bases of the petioles, in some places almost annulated and nearly smooth. Here and there occur rings of smaller petiole bases, mixed with brown wool, marking the number of inflorescence.

Leaves about 4 feet long: naked lower part of the petiole 14 to 16 inches long, canaliculate, convex, with teeth-like straight solitary distant prickles along the margins. Pinnæ very many, 7 or 8 inches long, $3\frac{1}{2}$ lines broad, outline decidedly falcate, lower margin decurrent: they are very coriaceous, unequally and very obtusely emarginate, points almost always broken, with one stout vein prominent on both sides.

Female inflorescence forming a dense terminal head, surrounded by several rows of abortive leaves, subulate from a dilated base entirely covered with pale rust-colored wool. Carpel leaves erect, connivent, scarcely more than 5 inches long, of which nearly $\frac{1}{2}$ consists of a cordate acuminate lamina, deeply subulato-pectinate, the acumen stout and entire. In the upper half of the elaminar part are the ovula 1-2 in the outermost, 4-5 in the innermost. These carpel leaves are covered (except parts of the inner side of the lamina and the points of the pectinations) with dense rust-colored wool.

Ovula smooth, roundish compressed bases buried in niches (marginal) of the carpel leaves, with a distinct perforated apiculus.

impregnation. As these unimpregnated sacs are short confined to the apex of the fruit; how does the Embryo get so low down in the albumen? by percursion of the sac? or by enlargement of a particular one.

The crown of the immature fruit is broader, and depressed, so that the apex is rather concave. The carpel leaves are no longer erect, but the elaminate passes outwards, the lamina inwards, and this part is much broader and more concave.

The ripe seeds (only seen detached) elliptical, compressed, 18 lines long, 12 across the narrow diameter, 16 across the broad diameter; the apex presents a small apiculus, the base a large hilum. The epicarpium outside is smooth, of a yellowish brown colour; the mesocarp rather thick spongy-woolly, consisting of white cells at right angles with the drupe, between the two, there is a cellular white shining layer, sprinkled with resinous? reddish dots.

The inner surface of the drupe is lined by a papery brownish tissue with longitudinal vessel.

The albumen separates naked except at the apex, the surface of which is slightly furrowed, to which a thin brown membrane with a mammilla in the centre adheres, underneath, there is a rather deep depression in the apex of the albumen, the fundus of this presents 6 greyish spots, to each of these corresponds an oblong cavity lined by a membranous sac.

Embryo very immature, attached by an enormously long curled up funicle, which arises from the union of 2 or more processes, passing down an equal number of the sacs.

Hab. Lower Assam, about Gowahatty, the specimens were obtained from Major Jenkins.

3. *Cycas pectinata*. Pl. CCCLX. Fig. 3.

Fruits disposed in terminal depressed heads, the carpel 1½ foot in diameter not as in the others becoming spreading or in any way reflexed.

Carpels exceedingly numerous, allied in this respect to C. revoluta as also in occasionally narrow leaves, stalks about equal to the fruit-bearing part and apex included, spreading, beyond the fruit enlarged into a cordate lamina ascending and then incurved connivent and imbricated. All the parts

covered with dense brown tomentum, the points of the comb-teeth and the inner face of the upper ones being more or less smooth. Lamina approaches to that of C. revoluta, deeply pectinate, laciniæ subulate, tapering into spinous points.

Fruits 2 to 4 alternating under the lamina, roundish, oblong, more or less angular from pressure, rich yellow, and at the apex, bearing a perforated mammilla.

Cycas revoluta. Thunb. agrees with (judging from Sir J. Smith fig. Linn. Trans. VI. t. 29, 30) C. pectinata in head of fruit, but the packing is not so close as to conceal all the fruit, as in C. pectinata. Then the hairs of the carpel, and the shape of the lamina are different, the pectines are irregular in direction, and deeper, some overlapping each other, lastly the fruit is hairy and red.

Cycas spherica is distinguishable in the Botanic Gardens, by a more feathery look of the crown, due to the pinnæ being less thick and opaque, none of the specimens have attained the size of C. circinalis, two males of which are very fine, and several times branched.*

4. *Cycas macrocarpa*, Griff., Pl. CCCLXII. Fig. II.

Petiolus crassus basi sub 4-angulatus, angulis lateralibus dentibus subulatis spinosis subopppositis horizontalibus vel leviter recurvis armat.

The upper part between the pinnulæ of either side is dark green, nearly the colour of the pinnulæ, and has stomatose spots. The under $\frac{1}{2}$ ditto is of the colour of the under half of the leaves, yellow green, and without stomata, although these organs only exist on the under surface of the pinnulæ.

Pinnulæ subopposite, vertical quoad petiol. margine infero subdecurrent. lineares subfalcatim curvatæ basi attenuatæ apici gradatim acuminatæ in subulam subpungent. costa

* C. sphærica is distinct also in the shape of the male or anther scales.

utrinque prominula, subtus albida, ochroleuci margines recurvæ,

Length of the leaves altogether, some 8 feet, that of the Pinnulæ 1-foot 4 inches,

Breadth of ditto 5-6 lines.

The whole length of the fruit, *leaf* and all is between a span and a foot. The leaf, is covered with dense brown tomentum. The part above the fruits which are bifarious and so crowded as to touch each other, very short, triangular cuneate divided along edges into subulate subspinous teeth, of which the centre one is much the longest. The fruits are sessile surrounded at the base by a sort of annulus, which is not covered, with tomentum, elliptic, and the size of a duck's egg, viz. $2\frac{1}{2}$ inches long, 1 inch 10 lines broad, so that the whole is heavy ; colour green, subsequently yellow, at the centre of the subdepressed apex there is a brown mammillate point.

Insertion by a broad base, nearly the size of the annulus.

1. Outer tegument of short ochroleucous colour and disagreeable fleshy smell, 3 lines thick.
2. Then brown drupaceous coat of fusiform cellular fibres, in the middle it is harder both on outer and inner surface.
3. Then a thinish papery, vascular brownish coat.
4. The Embryonary coat but separating with the preceding (except at the apex where it is very thin membranous and shining, subapiculate and sphacelate at the apex).

The albumen is furrowed, and slightly furfaraceous outside, as also combined in 3 and 4 ; the inner face is of elliptic form, rather compressed, with a 4-angular depression at the apex, angles at the base presenting a foveola or slit, from each of which a shrivelled subelastica strap hangs, till they all conflux into one, no embryo formed, nor did I hear of any male flowers being known.

Hab. Crew between Ayer Punnus and Tabong : only on one spot and that near a Kuramut or Musulman tomb, so that it may have been introduced.

For my knowledge of this I am indebted to Mr. Wester-

hout, who tells me the trunk is 10-12 feet high, distinctly ringed and with short stout branches at the apex.

The upper part of each origin of the funicle is a closed cellular bag occupying a niche immediately under the foveola or slit above mentioned ; on the apex of this are two roundish detachable brownish cells ?

The funicles only occasionally adhere, they are 4 or as many as there are bags, they have a marked resemblance to those of the young embryo of Loranthius, they have no vessels, the large one contains longitudinal opaque air-bubbles. The flesh is divided by yellow tissue into two equal parts, the inner of them has the cells at right angles with the drupe, and they are longer.

Malayan name *Pakoo Galowe : September*, 1842.

Sp. char. Petiola sub 4-gono in parte nuda lateraliter spinoso. Pinnulis suboppositis linearibus in subulam gradatim attenuatis, margine recurvis, folio fructifero dense ferrugineo-tomentoso, apice breve triangularis cuneato-pinnatifida in subulas glabras, quarum centrale multo majore, fructibus dense conjestis basi annulatis (magnis) ellipticis subcompressis.

Hab. Malacca at crew between Ayer Punnus and Tabong, near the Mahomedan tomb, specimens received from Mr. Westerhout.

The same *Cycas macrocarpa*.

Trunk 10-12 feet high, with distinct rings, and with stout short branches at the apex, (Mr. Westerhout). Leaves about 8 feet long.

The upper part between the Pinnæ is dark-green, like the upper surface of the pinnæ, and has stomata, the under corresponding part is yellow-green, like the under surface of the pinnæ, and has no stomata, although these organs only exist on the lower surface of the pinnæ.

Petiole stout, sub 4-angular at the base, the lateral angles armed with subopposite thorny straight or slightly recurved teeth. Pinnæ very numerous subopposite, linear subfalcate,

10-16 inches long, half an inch broad, alternate at the base where the lower edge is subdecurrent, gradually acuminated towards the apex into a sub pungent subulate point, margins recurved.

Cone of male flowers about 13-14 inches long; the short stalk surrounded by subulate pungent-pointed abortive leaves, covered with rust-colored wool-scales cuneate, excluding the apiculus about 9 lines long, 6 lines across in the broadest part, upper margin thickened cartilaginous-looking, from its centre arises a subulate acumen retrofractedly ascending, $3\frac{1}{2}$-4 lines long. Pollen cells in groups of 3-5 opening longitudinally along inner face.

Fruits crowded together into a terminal mass, intermixed with abortive leaves like those surrounding the male cone. Carpel leaves nodding 6-10 inches long, bearing the seeds about 4-5 inches from the base or abortive ovula, (these are sometimes as many as 8) beyond these expanded into a short triangular cuneate lamina, with pectinate edges, the central pectea being much the largest: where the seeds are attached expanded into sort of smooth annulus.* Seeds yellow elliptic (very large) 2-3 lines long, 17 lines across the short diameter, $18\frac{1}{2}$ across the longer. In the centre of the subdepressed apex is a brown mammillate point, the foramen. Hilum nearly as large as the annulus.

Outer tegument 3 lines thick composed of short ochroleucous flesh with a disagreeable smell. Drupaceous coat brown, composed of fusiform cellular fibres.

Inner tegument thinnish brown, papery, vascular. Third tegument separating with this except at the apex, where it is apiculate sphacelated, thin membranous and shining.

Albumen with a quadrangular depression at the apex, angles, with a foveola or slit at the fundus. From each of these hangs a subelastic strap which all becomes confluent and gives attachment to the embryo.

* N. B. The left hand figures (Pl. CCCLX.) not numbered or named on the original drawing perhaps refer to this species. Ed.

5. *Cycas dilatata.*

Trunk about 5 inches in diameter, externally marked with persistent bases of the petioles but not equally so, for in some places it is annulated, and almost smooth, in others crowded with the bases of the petioles. Here and there a ring occurs of smaller petiole bases, mixed with brown wool, marking the periods of inflorescence.

Leaves about 4 feet long, the naked part of the petiole 14-16 inches long canaliculato-convex with teeth-like straight solitary distant prickles along the margins from abroad base.

Pinnæ 7-8 inches long, 3½ lines broad, lower margin decurrence very coriaceous, unequally and very obtusely emarginate, points always appearing broken with one stout midvein prominent on both sides.

Female inflorescence forming a dense terminal crown surrounded by several rows of abortive leaves subulate from a dilation of the base, entirely covered with pale and cold tomentum.

Carpel leaves erect, ovule-bearing, dense part ferruginous woolly, beyond these dilatated into a smoother fleshy subcordate lamina, the margins deeply incised into subulate green long subpungent points, the apex broader entire subulately acuminate. The outermost bear no ovula: the next scarcely more than two.

There are about 4 ovula, on either side, close to the limb, the lower part of the petiole being naked.

Ovula attached by a broad base to a rather deep niche in the margin, about the size of a large pea, compressed, with a distinct apiculus, (the foramen).

A long section presents a central gelatinous body, surmounted by an apiculate brown cone, the apiculus of which corresponds with the foramen, the cone is hollow.

The crown of fruit (immature) is broader but so depressed at the apex as to be quite flat or almost concave. The carpel leaves are no longer erect, but curved, and the lamina is much broader and very concave.

The young seeds are oblong compressed 9 lines long by $8\frac{1}{2}$ wide, smooth, yellow, surmounted by a short reddish apiculus.

6. *Cycas* sp.

Truncus 4-5 rarius, 8 pedalis, vetustior vel basin versus exannulatis, apicem versus foliorum cicatribus notatus subannulatus, squamarum vestiguis inter annulos interjectis.

Petiolis basi incrassatis subteretibus utrinque lanceolatis.

Pinnulis linearibus angustis coriaceis, mucronato-acuminatis, decurrentibus inferior in spinas dentiformes reductis, quarum infimæ patentes, superior ascendentes.

Inflorescentia utriusque sexus terminalis.

Masc. amentum stipitat. stipita e squamis *lanceolat.* acuminatissimis creberremis erumpent. Ament ovato-lanceolat. pedale vel ultra, undique squamis spathulato cuneatis brupt truncato-acuminti (acumina subulato-ascendente) apice que cuneato ferrugineo velutinis, supra nudis, infra undique antheris tectis, infimæ difformes *vacuæ*, stipite ferrugineo velutino. Anth. 2-4 aggregatæ sessiles 1 loculares, introrsum longitudinaliter (quoad fasciculos) dehiscentes. Pollen abundantissima, ovatum læve *simplex*, aquæ immersim globosum, punctis *lineatis* 2-3 notat. (an semper.)

Fæm. spadices lineari-clavatæ, apicibus dilatato-complanatis, dense ferrugineo pubescent. angulatis, acuminatissimis, extimis intimisque sterilibus integris 4-dentatis, dentibus ovuliferis, *apex introrse* glabrato-viridis, ovula rotundatum apicibus *papilla cava*, fructibus ovatis glabris subsiccis drupaceis, spadicibus fructiferis nutantibus.

Hab. Mergue. Ad littoram umbrose maris, prope Chedea copiose.

Inflorescentia junior fæm. terminalis adultior axillaris, ob folias tarde vita.

Truncus cylindricus exogenus, albumen apex deprexa, 5-6 punctata. Punctæ tot saccis membrana propria vestitis

materia mucilaginos limpida continentis, ut primo perspexit illustriss. Brunonius.

Antheræ fibrosis, cellulæ efibrosæ saltem sublente $\frac{1}{1}\delta$.
November, 1834.

Cycas ovula of, Pl. CCCLXXVII.

1. Monstrosity of ovula of Cycas, two being united.
2. Long section of part one of these.
3. Ditto do. of normal and single ovule.
4. Ditto transverse section taken above the middle.
5. Nucleus laid bare, the envelope being detached except at its base.
6. Membrane lining the cavity of the nucleus.
7. Granules and cells, separated and viewed under pressure.

Calcutta: June, 6th-8th, 1835.

CONIFERÆ.

PINUS.

1. *Pinus spinulosa*, Gr. Pl. CCCLXIII. Vide Itin. Notes p. 145. No. 694.

2. *Pinus Griffithii.*, Pl. CCCLXV. Vide Itin. Notes p. 329. No. 21 ? The parts of the drawing are not numbered or named. Should the species be distinct from P. excelsa to which it is allied, it may be named P. Griffithii.*

The following figures are marked *Pinus longifolia of Pushut*, and probably belong to a different species from that represented on the same plate.

1. Female organ—ovula. The protruded portion of the coat is badly represented in asmuch as it belongs to the outer only coat.
2. Outer coat of one ovule partly removed shewing the nucleus.

* Edit.

3. Female organ, at a little more advanced period, the formation of the projecting part of the scale of the cone has commenced in the shape of a keel-shaped process between the ovula.

3. *Pinus excelsa* Pl. CCCLXVI. Pinus abies Gr. Mss. Vide Itinerary Notes p. 123. No. 398.

4. *Pinus Khasyanus* Gr. Pls. CCCLXVII and CCCLXVIII. Vide Itinerary Notes p. 58. No. 901.

HAB. Khasyah mountains.

5. *Pinus longifolia*, Pl. CCCLXIX.—CCCLXX. From Bootan.

1. Female flowers with apex of branch.
2. Spike of female flowers with the bracteæ? separated.
3, 4, 4. Female flower different views.
5. Ditto upper or posticous face, 6 opposite face.
7. Ditto opposite face, coat of ovule laid open shewing the nucleus.
8. Nucleus separated.
9. Ditto more advanced upper face.
10. Ditto opposite face.
11. More advanced, testa laid open of one ovule, sphacelation of nucleus as well as apex of testa evident.
12. Nucleus detached.
13. Branch with male flowers.
14. Leaves of base with the sheath.
15. Ditto sheath laid open.
16. Included base of leaves.
17. Male ament.
18, 19, 20. Anthers before dehiscence, different views.
21, 22. Ditto after dehiscence.
23. Pollen viewed as an opaque object.
24, 24. Ditto viewed in water.
25, 26. Ditto in spirits.
27, 27, 27. Ditto after maceration for an hour $\frac{1}{2}$ o

Pl. CCCCLXX. Ripe cones and branch of the same. Itin. Notes.

6. Pinus deodar *Nukhtar* of the Affghans. Vide Itinerary Notes p. 331. No. 34.

ABIES.

1. *Abies Webbiana*? Pl. CCCLXXI. A. densa Gr. Mss. Itinerary Notes. p. 141. No. 662.

AGATHIS.

The leaves of Agathis are directed obliquely upwards, their under surface is of a glaucous tint, arising from the presence of numerous stomata on their surface. The whitish tint of the surface on which these bodies occur, corroborates Dutrochet's statement, that the white spots are observable on some leaves, owing to the air cotained in the adjacent tissue.

The leaves of this species are coriaceous lanceolate obtuse. They consist of a cuticle, especially dense on the upper or stomatous surface, and dense parenchyma, in which the green colouring matter is developed. Through the centre of this several parallel vascular fascicles, which do not anastomose run. The central ones of which alone, reach the apex, the others terminating at the margins.

The stomata have generally a transverse direction, and have direct communication with the inter-parenchymatous spaces.

The vascular fascicles consist of extremely elongated fibrous tissue, ducts and spiral vessels, which occur neither rarely, nor in a rudimentary state. It appears to me that none of the *peculiar* tissue exists in the young tissue of Agathis.

In the wood, these bodies occur generally in single rows in the tissue composing the wood, occasionally in double rows, the bodies alternating with each other.

From the arrangement of certain cells of the cutis and of the outer surface of the scales, of young cones, and which

corresponds to the lower surface of the leaves, there is an evident attempt at the formation of stomata: an additional argument in favour of the scales, being transformed leaves. But they likewise exist on the upper surfaces although in less numbers.

Agathis loranthifolia, Pl. CCCLXXX.

The ovula have when the cone is about the size of an egg only one tegument. They are much flattened, their largest diameter being transverse with regard to the axis, both the hilum and exostomium are obliquely situated, but still opposite to each other. The primine is of considerable thickness, cellular elongated in the direction of the spire, formed by the cone into an aliform expansion. The exostome is open, the nucleus is fleshy-cellular, it is entirely enclosed in the cavity of the testa, to the foramen of which its apex as usual corresponds. There is a very distinct central cavity, lining which there exists a fine membrane, containing some granular matter, and forming a sac which adheres slightly to the surrounding parietes, and which seems to be closed at both ends, certainly so inferiorly. It adheres very firmly to the apex of the nucleary cavity, and tears rather than separates.

At a later period when the seeds are $\frac{1}{3}$ of an inch long, their shape is considerably altered, the testa has become coriaceous, the exostome is still open. The nucleus is spongy and constricted at its apex. The *membrane* which I have above mentioned seems to *have disappeared*. The cavity of the nucleus is occupied by the nascent embryo of an oblong shape, constricted at both ends, this is pendulous, hanging from the narrow neck of the nucleus, the tissue of the lesser and lower constriction is the firmest.

A.—Fig. 1. Ovule of *Agathis loranthifolia*, about 1 line long, it is inverted.

2. Ditto part of testa removed, *a* testa, *b* nucleus.

3. Do. longitudinal section, *a* testa, *b* nucleus, *c* cavity.
4. Longit. section of nucleus, *a* nucleus, *b* sac lining the cavity.
5. Membrane separated partially.

B.—Fig. 1. seed inverted.
2. Do. long section, *a* testa, *b* exostome, *c* nucleus.
3. Long section of nucleus, *a* embryo.
4. Nucleus more advanced.
5. Ditto long section, *a* embryo.
6. Embryo removed.

Thuja.

Thuja occidentalis, Pl. CCCLXXVIII. Fig. I, II, III.

The transition from the bracteæ clothing the peduncle of the galbulus of Thuja occidentalis, to the squamæ, is by no means abrupt.

In this genus there is a tendency towards completion of the carpella, the sides being prolonged beyond the real apex which is indicated by a prominence, the margins of which are transversely decurrent, if I may be allowed so strange an expression; judging from this tendency, we might expect to find a coniferous plant the seeds of which are not naked, in such a case, the fruit would be compound consisting of many simple single-seeded carpella.

The ovula in this genus are attached by a broad base, in a very young state they are marginal. The apex is attenuate the exostome large and irregular. The ovule is not very unlike a square flask. In all the specimens I examined, and which were all abortive, the primine was thick and osseous. The nucleus occupying the lower part of its cavity, being attached by a broad base. The apex is depressed and most distinctly areolate. At a later period and indeed when the galbulus appears perfect, the ovula are of considerable size, ovate, angular and somewhat curved. The testa is osseous and its exostome denticulate, the nucleus now occupies the

greater portion of its cavity, its apex is most distinctly depressed aud discolored, the base of this part being rather constricted: no protrusion of the nucleus takes place.

The opening of the envelope or the exostome communicates freely by a canal of moderate size with the cavity in which the nucleus is lodged. The apex of this latter being prolonged as it were into the canal. The vesicula occupying that part which is opposite to the union of the secundine with the primine.

The fasciculus of vessels appears on a longitudinal section to run up between the outer and inner parts of the envelope, or between the primine and secundine. The base of the nucleus is confounded with that of the secundine. This body is free only superiorly, where it is half ovate, the apex being acuminate. The upper part consists of tissue, dense and whitish, while that towards the base is yellowish.

The apex is membranous and transparent, marking the excavated termination of a canal, which runs along the centre of the nucleus, nearly throughout its upper half. The apex is distinctly perforate, the base of this is truncate and filled with air and dislocated tissue.

Towards the upper part of the base of the nucleus or its united part, there exists a large globular cavity. This is lined by a very fine membrane which may be detached, and then presents the form of a globular membranous bag. It is filled with mucilaginous, grumous and granular matter, having distinct cells intermixed. I should say that on separation, the granules and enclosed cells form a sort of membranous body, probably by attraction, see fig. 7.

Six days after fertilization. No change with the exception of swelling that had taken place in the pollen, which was adhering to the outside of the ovule, after it had been applied for several days.

The pollen is frequently seen in the exostome, and in the instance figured the membranous perforated apex of the nucleus contained many granules, from which no boyaux had

been emitted. The rim of the exostome is particularly at this period shining.

No change appears to occur in the pollen while applied to the exostomium, nor does there appear to be in any instance an emission of boyaux. The exostome is frequently blocked up by pollen, in which no alteration has taken place. The nucleus in sphaceolated towards its apex and at the base of the membranous prolongation. The excavation in the apex of the nuclens seems to be cleaner, so to speak, sometime after the application of the pollen.

The boyaux are emitted as I suspected first from the firmness with which the grains of pollen adhere to the parietes of the excavation, which is absolutely crammed with granules of pollen. The boyaux are only generated towards the base of this canal.

There is nothing developed at this period, within the vitellus the parietes of which are a *perfect membrane*. This sac is filled with a fluid and grumous matter, in which last occur at considerable distances, distinct sacculi or cells. The grumous matter and the contained cells cohere and appear like a membrane.

The thecæ polliniferous are composed of tough membrane, apparently not cellular, marked with frequent lines obtuse occasionally clavate striæ, which are of a light brown colour, within this membrane there appears to exist a much finer membrane. There are no traces of the fibrous cells so frequent in the ordinary form of anther.

Eight days after fertilization.

The excavation of the nucleus is crowded with pollen granules, the great majority of which are with the exception of some tumefaction, unchanged. The parietes of the lower part of the cavity are *stigmatic*, that is the tissue is papillose and lax. The ovula are considerably enlarged, as is likewise the cavity of the nucleus. The vitellus is much more cellular.

The majority of granules have not generated boyaux. These appear to penetrate the lax papillose tissue with

which indeed they may be confounded. They are however at once known by the presence of granules in *their heads*, the *cells* being entirely destitute of these bodies. I may observe, that the boyaux appear to be confined to the truncated dilated bottom of the excavation. Their course cannot be traced unless by dissection; the tissue being exceedingly soft and rendered opaque by the pressure of even the thinest mica. They are filled with granules, which are as usual of two sizes large and small, both being endowed with mobility but not in a high degree.

The tissue of the nucleus also surrounding the excavation, is now of a high brown colour.

I had set out with the supposition, deduced from observations on Nelumbium and Crotalaria, that there would be mere application of the pollen to the nucleus, and that no production of boyaux would take place. And I argued that the boyaux were produced in other plants in order to bring the surface of the pollen into contact with the nucleus, taking this view of the case, the granules would perform some other function, the mere nutrition of the containing membrane. It is now evident that mere contact of the pollen or of its tubes with the nucleus is not sufficient, as might indeed have been surmised from what takes place in Asclepiadeæ. But that actual penetration of the boyaux into the substance of the nucleus is absolutey essential. The determination of the precise state of the pollinia at the period of the first appearance of the embryo, will throw great light upon this most intricate subject. If this does appear while the boyaux are appreciable, the tardiness of the appearance of the embryo in the Mergue Cycas, will depend upon impregnation not having taken place.

Ten days after. The excavation appears to be lined towards its base with a grumous mucilaginous fluid in which the pollen granules are immersed, at least this is the appearance that a longitudinal section presents. The boyaux have no apparent determinate direction, but penetrate the tissue at the base and

round the sides of the excavation. Then umber of granules contained in the visible parts of the boyaux, that is, in those parts which are not imbedded in the tissue is evidently much deminished, many of the grains of pollen which have not generated boyaux are nearly empty. Can these have excited any action on them? The Quintine is at this period tender, and is easily detached. It appears like a whitish ball of the size of a small pea. It is now distinctly cellular, the cells being exceedingly lax and of irregular figure, and hence does not collapse on the rupture of the cuticle, as it may now be termed. Mixed with the lax tissue are granular bodies, which perhaps may be the nuclei of the cells escaped on pressure, as they frequently occupy the axis of the cells. The bodies appear like sacs with irregular superficies, and contain many small granules.

The cellules of this sac are formed from without inward. Those of the periphery being in a state of cohesion, while the centre of the sac is occupied by fluid.

The outlines of the lately formed and distinct cells are exceedingly faint, even under a triplet $\frac{1}{3\,5}$. These contain many granules which are in exceedingly active motion of a vibratory and rotatary nature, accompanied with very irregular and quick change of situation. These cells vary much in size, and in the larger which are of irregular outline, there is an evident, though faint tendency to subdivision. It is a most extraordinary fact, that these actually undergo slow changes of form, even when detached, and are still in the field of the microscope!

The indications of subdivision are merely owing to a greater aggregation of the globules. These bodies are particularly active in the new sacs, in which they are most transparent. There is some similarity between the appearance of these and of germinating sporules of Marchantia.

At this period, the sac is tense, and when pierced by a needle the contents are propelled to a considerable distance,

when the chief bulk of the sac is occupied by cellular tissue, the granules are still abundant, but they are stationary.

Connected with these observations, I should think that the development of the ovula of one carpellary leaf, occasionally varies much, the sac of the vitellus being at the period above mentioned, generally cellular, occasionally, nearly, or entirely liquid. Indeed the above observations relating to mobility and change of form occurred in an ovule, the others of whose carpellary leaf had cellular, or nearly cellular vitelli. —*June* 18*th*, 1835.

Thuja occidentalis, Pl. CCCLXXVIII. Figs. I., II.

1, 2, 3. Ovule of Thuja occidentalis from the same galbulus. The two former from the axillæ of the outer, the last from that of the inner scales.
4. Ditto No. 3 long section.
5. Nucleus detached.
6. Ovule from a full sized ? galbulus.
7. Ditto long section.

June 16*th*, 1835.

Cupressus.

1. *Cupressus tortulosus* Pl. CCCLXXII. Cupressus pendula, Abies Brunoniana Gr. Itinerary Notes pp. 100, 131 Nos. 27 and 529.

a. micropyle, *b* wing, *c* ossified testa, *e* nucleus.

Juniperis.

1. *Juniperis recurva*, Pls. CCCLXXIII. and CCCLXXIV. Male and Female : vide Itinerary, Notes p. 145. No. 696.

2. *Juniperis excelsa*, Pl. CCCLXXVII. Figs. 8, 8, 8*a*.

These figures represent a portion of the tissue of juniperus excelsa, of the Himalaya mountains. It is obvious that these supposed pores are ovate round bodies which are stuck across the cavity of the cells, or elongated

tissue in which they are developed. The ring inside corresponds exactly to the supposed opening in the containing cell. The irregular marks seen in the lower part of the sketch, are probably the remains of cellular tissue. This accords with Lindley's idea of this structure. It is certain, that apparently large holes are left in the containing tissue when these glands have fallen out. Lindley, however, passes over the central areola visible in the body itself 8*a*, which uniformly transmits light of a yellowish green colour. My friend Valentine, who is unrivalled in delicacy of dissecting, shews this areola to arise from the presence of a glandular looking body of the above colour.

Pl. CCCLXXVII. Fig. 9, is an imaginary figure of this tissue, and will be at right angles with the preceding figure 8*a* ; it represents the membrane, which I suppose to be perforated opposite the axis of each body, viz., *b*, *b*, *b*, *b*, *b*, *b*, *b*, *b*, and is somewhat vesicular or rather raised up here ; *d*, *d*, *d*, *d*, will represent the body transversely across the tube ; *e*, *e*, *e*, etc., will represent the glandular yellowish body occupying the axis of *d*, *d*, *d*. This certainly accounts for the anomaly in a better manner than has hitherto been given.

This section is supposed to be carried through a portion of the tube, and through the axes of four bodies adhering to the tube.

Objection : two areolæ should be visible, looking vertically on the tissue, the areola of the containing membrane is that of the subexserted apex of the glandule.

The explanation of Dr. Mohl is obviously highly unsatisfactory, and has the disadvantage of giving no rational account whatever of this peculiar structure.

Section made at an angle of 45 present nothing but parallelogramic reticulations, the margins of which are ragged. *June 8th*, 1835.

TAXACEÆ.

Taxus, 2 sp. Pl. CCCLXXV. One with axillary the other with terminal inflorescence. Bootan collection.

3. Taxus contortus? Pl. CCCLXXVI. Vide Itinerary Notes. p. 351. No. 116.

Podocarpus.

Podocarpus, Pl. CCCLXXXVI. A. Fig. I.

Frutex dioicus, fol. sparsis linearibus acutis rigidis, amentis basi squamatis, parte antherifere nudis. Per. 0. stam. plurima in spicam amentiformum disposita, subsessilis. Anth. maximæ subreniformi biloculares longit. lateraliterque dehiscent. Pollen album læve, medio diaphanum et subconstrictum.

Mergue : *January*, 1835.

GNETACEÆ.

Gnetum.

1. *Gnetum*, Pl. CCCLXXXVI.A. Fig. II.

Frutex scandens. Ramis articulatis pendulis.

Petiolis insertione humidis, foliis lanceolato-acuminatis, coriaceis. Inflorescentia extra axillares in axillis foliorum nempe deciduorum, floribus inconspicuis, viridescentibus.

Spica vel axis florifera subcylindrica, androgyne involucris integris marginibus truncatis interruptis annulis similibus circa axim dispositis stipata, partibus floriferis vel intra annulos involucrorum pilosis, pilis articulatis.

Masc. flores inferiores numerosiores. Per. 1-sepalum clavatum, margine incrassata integra. Stamen 1 hypogyna plano clavato, perianthium excedens. Anth. bilocul. didymæ, loculis longitudinaliter et centraliter dehiscentibus. Pollen.— ?

Fæm. Per. duplex texturâ membranaceum decoloratum,

connivens, extus profunde bipartitis, laciniis subintegris. Inter bisepalum ? sepalis apice bifidis. Corpus centrale——ovulum ? nudum carnosum, apice 3-denticulatum (an foramen) solidum.

Diandrum esse conjicio, filamento vasorum fasciculi 2 laterales ad sunt, nec centralis ut in filamentis monandris et anthera vere didyma e loculis 2 omnino discretis. Descriptio generis (Sprengelii) pessima, Jussuea a Linneano exceptum valde incompleta.

I am as yet ignorant of the nature of the envelopes of the female flower. The central fleshy ovate body appears to be a naked ovule, the obsolete denticulations arising from the margin of the foramen. The nature and structure of the two envelopes indicate them to be perianthial.

1. Female flower, outer perianth laid open.
2. Ditto outer perianth removed.
3. Ditto ovule ? removed inner perianth open.
4. Ovule, or solid central body.

Hab. In sylvis. Pulo Gewen, Mergue: *Nov.* 1834.

2. *Gnetum scandens* Roxb. Pl. CCCLXXXVI. A. Fig. III.

Scandens, pendensque, fol. oblongo-lanceolatis obtuse acuminatis coriaceis repandis, supra atroviridibus nitidisque subtus reticulatis. Inflorescentia terminatis, spicis paniculata dispositis, oppositis $1\frac{1}{2}$ uncialibus, viridibus.

Annuli arcte involucrantis, integri, flores pillis moniliformibus cellulosis *albis* immixti : fæminei superi pauciore-que. Basis ima cujusque verticeli, pilis ejusdem formis densissimis occupata. Per. masc. 1-phyllum, obconicum, apicem versus carnosum, virideque fissureque. Stam. 2 hypogyn. filam. omnino in tubum cellulosum connat. Anth. 1-2 loculares, pollen læve.

Fæm. per. exter. celluloso-membranacea, connivens, apice 2-fidum. Inter. minus 2-partit. laciniis acuminatis. per. externe obtectum, nucleus centralis, apice truncat.

Hab. In sylvis inter Mergue et Kulweng etiam prope Beiktown. 1833.

Dignitas partium non mihi satis clara, ob nucleo solido. An membranæ exteriores pro tegumenta ovuli habendæ?

3. *Gnetum Brunonianum*. Gr.

Frutex humilis ramosus erectus, ramulis teretibus ad articulos incrassatis, fol. breviter petiolatis lanceolato-oblongis subabrupte acuminatis subrepandis venis secondariis intra margines anastomosantibus, integris glabris spicis axillaribus terminalibusque *solitariis* infra flores ancipitibus, et ad medium hujus partis, bibracteatis, bracteis connatis bases versus, annulis involucratibus obsoletis, membranaceis, repandis, floribus nudis, masculis pluriseriatis, superior primo evolutis; fæm. 1-seriatis, viridibus, pilis floribus immixtis cellulosis albis species distinctissima.

Hab. Mergue. Frequenter in sylvis densis prop *Banlaw*: *February*, 1835.

Gnetum Brunonianum, fruticosum erectum, foliis membranaceis oblongo-lanceolatis repandis, spicis axillaribus terminalibusque solitariis, pedunculo medium versus 2-bracteatis, annulis obsoletis.

4. *Gnetum apiculatum*. Gr.

Fructibus subdrupaceis succo aquoso dense spicatis, basi fructus annulus involucrantibus persistent. pilisque brunneis postico magis accretis stipatis, ovatis glabris, apiculo acuto terminatis, subaurantiaceis, 1-locularibus, 1-spermis, semen erectum conformum, spermodermis extus fibrosa, intus cellulosa! apice apiculata.

Embryo solidus, superne apiculo sphacelato, carnosum, ad apicem excavat. an semper? linei longitudinali centrali basin nec attingent notat? an embryo verus, et corpus carnosum per albumen habendum?

Tegumenta hoc ordine sequuntur, extima membranaceum glabrum, secundum fibrosum, fibris fusiformibus, aureo-brun-

neis nitentibus, inter hæc dua materia cellulosa succosa 4-tum. tenuissima e fibris transverse dispositis, 5-tum cum hoc separans, e cellulis brevibus transverse flexuoseque dispositis hæc dua, valde elastica sensu transverse 6-tum cellulosofibrosum, fibris fusiform aureis, longitudinaliter dispositis, 7-tum, semen involvens sed etiam 6-to adnatum, cellulosum.

Cavitas apicalis sæpe corpus e cellulis longissime flexuosis, continens, hoc cum basis cavitat. adnexum.

Hab. Mergue.

5. *Gneti sp.* Pl. CCCLXXXI. Fig. II.

Frutex scandens.

Hab. In sylvis versus Colleyang Journey from Assam to Ava: *March 25th*, 1837.

Ephedra.

Pl. CCCLXXXI. Fig. 1.

The same organization prevails in the female flowers as in Gnetum: Mr. Brown originally affirmed the instances of truly naked ovula.

This genus is a remarkable one, and has marked analogies in certain important points with Equisetum and Casuarina? With the former its cuticle seems to perform the principal aërating functions, and it abounds in silex, the particles of which appear to have no definite arrangement, but occupy the disks of the stomata!

At least such is the supposition, I have for the present formed, it is easily proved by examining the surface at early periods, and the very young leaves, otherwise I can in the mature ramuli find no stomata.*

* I find that in Ephedra Asparagina Itinerary Notes, p. 340, no. 67, there is no deposition of silex in the cuticle, which has stomata, arranged as the discs of the silicous species, longitudinally along the spaces between the bundles of elongated fibre.

So far my supposition is borne out.

This species approximates, to Coniferæ having generally whorled acerose leaves on its young branches.

The structure is exogenous, the wood has the usual markings, and is almost destitute of vessels, it is hence compact. The pith is from an early period, the receptacle of glandular secretions, which, when solidified, separate readily from their containing cells, whose form they almost necessarily have.

The bark is the part in which the aëration of green parenchyma takes place, it is thick and altogether green, except the gray cuticle, and contains rather numerous bundles of highly attenuated *woody* fibre; which bundles are approximated to the cuticle.

This last organ is papillose; the papillæ are irregular in size and distribution, but generally grouped in a certain order; these I take to be stomata, their disc is prominent greenish and separable in the form of subamorphous, *i. e.* scarcely crystalline masses which I take to be composed of silex.

The structure of the male flowers approaches in the perianth to Gnetum, but this covering is bipartite, the lobei covering each other closely, that next the axis or posterior being outermost. The anther presents nothing peculiar. That of the female (to one extensively acquainted with ovula) is not to be mistaken.

The outer coat is much like that of Cycas, and as in all such epericarpeal plants, is of sufficient substance to afford protection, *and sufficiently green to perform aëration.*

The inner membrane (like all the others) is elongated, but in excess, into a tube twisted towards the end which is more or less spathulate.

In it is a nucleus, with a depressed apex, of the usual cellular structure and appearance, and in this is developed the embryonary sac from above downwards, which sac is cellular, and so forms another exception to my practical rule for determining the future presence or absence of albumen from examination of the ovulum. Occasionally, in one instance the presence of a toothed oblique cup was observed surrounding the axis, terminating which were two opposite bracteæ, and one female flower.

The presence of an oblique scale round the base (on one side) of the ovule is common, but is generally if not always due to the separation of the scales above their bases on the application of force.

The character of this order in Lindley's Introduction, taken from Blume is open to considerable objections: of this the term projection applied to the attachment of the male flowers is one instance.

Then the female flowers are said to be sometimes sheltered by a false calyx consisting of two scales more or less combined, each of which surround one or two flowers a structure impossible, unless the scales are lobed, which they are not.

When two flowers are developed one may be axillary and the other terminal, or both axillary; when three, the relation they have to the scales and axis is obvious, when one, the axillary ones are abortive, because the plant is dichotomous, and in all such cases the terminal flower is developed first.

The style-like process is not formed from the membrane of the nucleus, in the sense here implied, or it is perfect before the nucleus is so, although probably originally formed from it.

Then no evidence is given about the protruded style-like process of the fruit before maturity, which process is the apex of the secundine, or inner coat. And with regard to the hypothesis assumed, it is totally contrary to all analogy, for in all instances in phænogamous plants when a peri-carpial integument or pistillum exists, a stigma exists also. To this there is no exception.*

Then the assumption of the protrusion of the outer coat of the ovule is contrary to analogy, in all cases the tendency to this protrusion is greatest in the inner coat, the embryonary sac half filling the nucleus perfectly long before the an-

* Yet the female flower is far more præcocious MALES.

thers are perfected. Then the outer coat is rarely evascular, and as rarely if ever membranous, both which contingencies exist in Ephedra, if Blume's theory be adopted.

Lastly the perianth of Ephedra is not closed up, and is not eventually ruptured.

The remark of the more perfect evolution of Gnetum is a good one, and worthy of much attention.

It is a remarkable fact, and one that shews well the opposite directions of the growths of the male and female organs, that although the terminal spike is developed in both sexes, the terminal flower of the males is invariably absent, this however is most obvious in the organs of vegetation, particularly the leaves.

1. Portion of female inflorescence.
2. Female spike laid open.
3. Ditto at a younger period.
4, 5. Apparently abortive, the two inner scales, one of which is removed in fig. 4, were submembranous and not green, surrounding their common stalk was an oblique cup-shaped process.
6. Ovule detached, oblique scale on one side, probably the base of one of the decussate leaves or bractes.
7. Outer coat ½ taken away.
8. Apex of the styliform elongation of inner membrane.
9. Both membranes partly removed shewing the nucleus
10. Nucleus detached.
11. Oblique view of its apex, as an opaque object.
12. Nucleus, surrounded partly about its base by the membranes, at a more advanced stage.
13. Nucleus, long section, shewing the embryonary sac.
14. Embryonary sac, with its free apex imbedded in the base of the nucleus.
15. Portion of cuticle, stomata choked by siliceous matter.
16. Section of a branch of one year's growth.
17. Section of ditto of Ephedra asparagina, which has stomata of the ordinary sort.

POTALIACEÆ.

Potalia.

Potaliæ sp., Pl. CCCLXXXIII. Fig. I.

Frutex cortice seniori cinerea, juniori fusco viridi, fol. juniori brunneo-fuscescentum, flores albi ingrati odorati. Anth. brunneæ fructibus juniorib. viridib.

Hab. Inter Nidding et Culleyang Delvi: *Icon. It. Av. no.* 28, *March* 23*rd*, 1837.

LOGANIACEÆ.

Fagræa.

Fagreæ obovata, Pl. CCCLXXXII. Itinerary Notes p. 39. No. 631.

Arbor 35 pedalis elegans, foliis petiolatis oppositis, ad apices ramulorum tantum, lanceolato-obovatis, sæpius obtuse acuminatis, integris glabris, petiolis basin dilatatis, *partib. dilatatis subconnatis*, adeo ut stipulæ intra petiolaris mentient. Inflorescentia axillaris cymoso-corymbosa, corymbis foliis breviorib. multifloris, cymis trichotomis. Bracteis parvis ovatis membranaceis, ad basin ramulorum. Pedicellis paulo infra medium bibracteolatis, floribus majusculis, ochroleucis, suavissime odoratis, odore jasmineo-lonicera.

Cal. 5-fidus, tubo brevi, dentibus rotundatis, marginibus membranaceis.

Cor. infundibuliformi-hypocraterif. tubo calycem 3-plo excedent, limbo 5-partito, laciniis ovatis obtusis patentib. æstivatione contortum imbricatis.

Stam. 5, fauci inserta, petalis alternant. longissime exserta, filam. filiforme ad exsertionem deflexa, tunc ascendentia anth. subversatilis bilocule longit. dehiscens. Stylus filiformis longe exsertus. Stigma capitatum, ovarium superum, biloculare, loculis 00 ovulat. ovulis placentus carnosis transverse

affixis foramen hilum prope. (See Pl. CCCLXXXVI. A. Fig. XI.) Pollen oblongo-ovatum l-sulcatum, aquo immers globosum papillosumque.

Mergue: *December*, 1834.

ASCLEPIADEÆ.

Stapelia.

Stapelia, Pl. CCCLXXXVIII. Figs. 13, and 14.

Cal. 5-sepalus. Cor. rotata profunde 5-partita laciniis ovato-lanceolatis longissime ciliatis, fauce laciniarumque basibus pilis sanguineo-purpureis longis, barbat. sublente $\frac{1}{3}\frac{1}{5}$ punctualis (motione nulla visibli.) Textura corollæ carnosa, colore fusco-sanguineus, rugis elevatis callosis, anastomasantibus albidis.

Corona staminea duplex, extus 5-phylla foliolis petalis oppositis, linearibus subplanis apice 3-dentatis. Interior 5-phylla petalis alternantia et staminibus opposita, erecto patentib. triangulari-subfalcatis profunde bifidis, margo supera incrassata triangularis, canaliculata ultra sinuum in subulate productis, pars relique complanata in apice denticulato.

Antheræ subcarnosæ, simplices, lateraliter longitudinaliterque dehiscentes.

Pollinia erecta, cereacea, 10-caudiculæ breves extrorsum quoad pollinia gibberem product. massæ ovatæ anticæ curvatæ et secus marginam anticum truncatæ, ibidemque dehiscentes. Glandula ovata, medio sulcata nigra

Stylus sub o. Stigma truncata, bifoveolata, angulis prominentibus, ovarium tereto-subulata. Ovula 00. funiculo brevi, sulco profundo bilabiato hilum prope. Nucleus ante fecundationem apparens.

Calcutta: June 14*th*, 1835.

Mr. Brown in the generic character of Cryptostegia. Bot. Register fol. 435. says "Glandulæ 5, spathulatæ, angu-

lorum stigmatis pollen granulosum (simplex) colligentis."

This means I suppose simple with regard to the non-aggregation of *masses*, for each individual grain of pollen has certainly the ordinary periploceous structure.

In this structure, this plant accedes closely to Cryptolepis.

I have examined both in the *Hort. Bot. Calcut. June*, 1835.

Hoya.

1. *Hoya viridiflora*, Pl. CCCLXXXVIII.

1. Flower.
2. Ditto perianth removed.
3. Ditto Perianth and one of the fissures, a pollen mass is observable.
4. Ditto all the processes of the corona removed. A gland with its pollinia is seen opposite one of the fissures, into which the tubes are descending.
5. Gland and Pollinia (front.)
6. Ditto lateral.
7. Ditto emitting tubes.
8. Portion of the interior of a pollen mass, which has bursted.
9. The same viewed externally.
10. Detached grain with its tube.
11. Long, section of ovarium and style; gland and pollinia attached; the brown spot at the apex of the placenta indicates the passage of the cord of tubes.

Vellore: August, 1833.

2. *Hoyæ sp.*

Scandens et subparasit. in arboribus.

Caulibus crassis, albis.

Fol. vel caulinis *vel in ramis brevissimis* ovato-oblongis crassissimis coriaceis, 1-veniis sæpe cochleato-concavis, pallidis petiolis ½ uncialibus.

Umbellis folia subæquantibus perennantibus; floribus nu-

merosis, longiuscule pedicellatis carneo-fuscescent. Corona rubro purpurea.

Pedicellis apice incrassatis (fructiferis robustifactis).

Cor. rotata, laciniis cordatis margine apiceque recurvis, secus margines celluloso-fimbriatis.

Coronæ folioli carnosa depressa et supra concavum. Polliniorum compressorum, crista (externa), much developed.

Tendency in leaves to Ascidia, but the direction is reversed to Dischidia, for it is the upper surface, that is concave.

3. *Hoya*? Pl. CCCCX.A. Fig. 2.

Epiphytica in arboribus pendens subscandensque. Caulibus teretib. fol. lanceolatis subacutis mucronatis enerviis carosis crassis ad basin foveolatis, umbellis pendentibus, eformibus, pedicillis exterioribus nempe longioribus, unifloris, floribus carneis elegantissimis parvis inodonetis, corollis rotatis densa barbatis, laciniis revolutis apicibus nudis. Corona 5-phylla foliolis lanciolatis sagittatis carnosis intus in dente antheræ incumbent product. extrossum sagittatim bilobis, medio in cristam parum prominula elevato. Anth. membranaceæ terminatis fluris maximis.

Pollinia erecta oblonga compressa margine exteriore quoad glandula truncata, pellucida cartilaginea, stigma breviter apiculat.

Hab. In arborib. ad lilloram Maris. Ins. Madam. *Mergue: March*, 1835.

Hoya certe rudimentarum generarum includit quorum type sunt Hoya viridiflora, distincti polliniis non margine bruneatis coroneque foliolis. This is the same as no. 5, in *coronæ foliosis*, but distinct in *corollaque barbatis*.

4. *Hoya*? Pl. CCCLXXXVII.

1. Flower viewed in front.
2. Long section of do.
3. Corolla removed. Corona staminea exposed.

4. Section of corona staminea, Cal. Cor. Ovaria and styli removed, stigma remaining.
5. Part of the corona staminea, the processes cut off.
6. Pollen mass in front.
7. Follicta.

This is certainly not a true species of Hoya, although it is a congener of Hoya viridiflora.

HAB. Mergue.

5. *Hoya volubilis*, Pl. CCCCX. A. Fig. 3.

Scandens volubilis caulibus teretibus, foliis ovato-lanceolatis acutis coriaceis glaucescentibus basi, 1-callosis, indistincte 3-nerviis, umbellis intrapetiolaribus longe pedunculatis, floris. Pedunculis perinnantibus, folia excedentib. apices versus cicatricibus inflorescentia antecedentis notatis. Pedicellis filiformibus 1½ uncialibus basi minute bracteatis, masculis irregularibus purpureis, floribus magnis, albidis, *cereaceis* coronæ foliolorum angulis intrantib. rosaceis, anth. lutescent.

Cal. 5 partit. Cor. subrotata profunde 5-partit. laciniis late ovatis acutis intus lucidis. Corona 5-phylla, foliolis carnosissimis, radiatis, supra planis, *ovatisque*, angulo intrante dentiforme in antheram product. incumbentemque. Antheræ membranum terminatæ. Pollinia erecta basi affixa, margine interiore quoad antheram, cartilagineam diaphanam. Stigma apiculo brevi, apice membranaceo.

Epiphytica in arborib. Mergue: *March*, 1835, flores suaviter odorat.

The pollinia on being detached and especially if put in water become twisted, so that they have the same arrangement as those that are naturally pendulous. It is impossible to make them revert it to their natural situation. Very probably the fact of their being erect depends upon some local appreciable cause, to be ascertained by examination of these in the young state. Æstivatio subvalvata, nec Hoyæ

genuina civis ejusdem generis cum Hoya viridiflora. Partis floris interdum quaternaria.

6. *Hoya.*

Scandens radicansque in arboribus glabra, caulibus ramosis teretibus, foliis breviter petiolatis carnosis ovato-lanceolatis 1 $\frac{1}{2}$ uncialibus acutis subtus pallidis umbellis simplicibus, sæpius terminalibus aliquando subintrapetiolaribus foliis longioribus Pedunculo perenni clavato, floribus albis dilutissim rosei tincti, corollis barbatis revolutis, ciliis intra petiola. O. maculat, radicibus infra axillaribus follicul. brunnea.

Hab. Mergue. In sylvis *Madamacam*, *August*, 1834.

If this is a Hoya, H. volubilis, certainly constitutes a distinct genus, which may be distinguished as follows.

Cal. parvus 5-sepalus Cor. rotata reflexa. tubo brevissimo limbo superne barbato, corona staminea exserta 5-phylla, foliolis depressis carnosis ovatis, parte acutis in antheram, incumbento, tubo duplici, corolla adnata, secundo omnino libero corollæ insidenti. Anth. membranea terminata.

Pollinis erecta geniculis extrorsum processum gerentibus. Stigma obtuse apiculat. Folliculi gracilis. Sem. carnosa.

7. *Hoya velutina,* Pl. CCCCX. A. Fig. 7.

Scandens pendula exarboribus, totam corollæ paginæ interiora excepta, pubescens.

Fol. oblongis basi subpeltato cordatis, acuminatis subobtusis margine recurvis coriaceo-carnosis obpendentum quasi resupinat.

Umbellis inter petiolaribus, plurifloris, pedicellis uncialibus clavatis, floribus amplissimis diametro 1 $\frac{1}{2}$ unciali albidis cereis, subinodoris.

Sepalis erectis majusculis oblongo cordatis.

Alabast. vertice depressa, 5-angulato, valvat.

Cor. rotata carnosa cerea, laciniis paullo infra medium product. triangularibus, margine revolutis nitent. glaber.

Corona foliola carnosa vertice planiuscula vel concava leviter subtus oblique, scooped away, angulo interior linguiforme centrum axeous attingens, margine membranes. Anth. depresso-horizontalis margine membranaceo undulato.

Glandula brunneo-nitens. magna *apice externo* in setas leviter recurvatus product.

Caudiculæ planiusculæ sigmoideæ curvatæ longæ. Pollinia obovata, margine simplice. Styli disci capiat. in conum central. subclavat. radiato-striata.

Ovula plumina, placentam superficeam omneam externam convexam occupant.

Hab. Malacca. In sylvis littorat. Tangong Cling. An H. Velutina Wight Asclep. Lac copiosum. Flor. Febrio.

Asclepiadeæ. Gen. nov., Pl. CCCCIII.

Suffrutex volubilis, glaber. Caulis viridis compressiusculus linea pubescente alternatim notatus.

Fol. petiolata elliptico-ovata, basi obsoleto-cordata, breviter acuminata cum mucronulo integra, marginibus recurvis, superne atro-viridia sublucida minutissime puberule inferne pallida glabra, basi. 5-venia, venis lateralibus indistinctis, et glandularum conicarum seriebus duabus ima basi stipata, vena primaria secondariæ, tertiariæque pauceæ infra prominulæ, cristaque undulata membranacea insignita ! V. secondariæ arcuatæ, tertiariæ variæ anastomosantes, quartariæ incospecuæ.

Petiolus crassus uncialis vel 1½ uncialis supra planiusculus, subtus alato-carinatus, carina basin versus evanida.

Pagina infera tantum stomatosa.

Racemi subinter petiolares in umbellis spurias contracti. Pedunculo petiolo multoties breviore.

Pedicelli basi bracteas minuti suffult. pilis brevissimis brunnescentibus adpressis puberuli, ut etiam bracteæ, initio involuti ! Flores inodori, mediocres, aurei, rubro-brunnei crebre punctulati. Corona staminea atro-purpurea, pili pennicillorum purpurei. Antheræ atro-brunneæ.

Calyx ordinis, sepalis 5 lanceolatis carnosiusculis, imbricatis.

Cor. rotata, profunde 5-partita, laciniæ lanceolatæ, carnosæ mucronulo brevi viridi termintæ, dorso pubescentes, et punctulis subclavatis, sublentem notatæ, æstivatione valvata, alabastra pentagona.

Corona staminea 5-phylla. Foliola carnosa concaviuscula cordata, extus bilamellata; lamella utraque acuminata apice pilorum rigidorum fasciculo-pennicillata, exteriore longiore, intus dente obtuso, rugoso, stigmatis apice æquante aucta, sed in antheris nullo modo incumbente intus concavo.

Antheræ membraceæ: apici simplices, in stigmatis capiti arcte incumbentes, minutæ.

Pollinia, basi affixa subtransversa, minutissima, rotundata *margini interiori* quoad par quodque exteriori quoad antheram truncata, hyalina. Glandula triangularis antice brunnea, postice pallida, caudiculæ semiopacæ breves, latissimæ, marginem superum totum glandulæ occupantes.

Stigma apice depressum planissimum muticum; interdum obsoletissime bimucronatum. Ovarium ordinis; ovula ascendentia oblonga, foramine sulciformi. biseriata.

Placentæ extrorsum productæ in lamellam loculorum parietibus applicitam et ovula fere obtegentem,

HAB. In sylvis, *Suddiya*: *Upper Assam*, *July*, 1836.

Genus certe novum: Hoyæ notis quibusdam affine; distinctissimum obcorollam æstivatione valvatam, foramen foliorum coronæ stamineæ stigma depressum, et ovula biserialia; structure in ordine mihi plane ignota.

1. Alabastrum first before expansion.
2. Section of corolla shewing its valvate æstivation.
3. Flower.
4. Ditto corolla removed, miserably out of perspective, the inner process of the back foliole not shewn.
5. Vertical view of corona staminea and stigma.
6. Ditto two of the foliola, bent back with their anthers shewing the situation of the pollinia.

7. Apex of corona lateral view, foliole removed, shewing the very small clefts, by which the pollen tubes would at *a* pass down to the apex of the style.
8. Pollinia pair of, viewed in situ and looking vertically down on the stigma.
9. Ditto in situ, but viewed rather laterally.
10. Same as 8, but the furrow is wrong, this is only visible on the outer angle or base of the gland.
11. Pollinia viewed laterally.
12. Pollinia, same as 8, furrow wrong; the masses displaced.
13. Pistillum, one of the ovaria laid open longitudinally to shew the extention of the sides of the placenta.
14. Ditto vertical view, ovula bases of, only visible.
15. Ovary transverse section, ovula nearly enclosed by the convolute placenta.
16. Ovary cut down longitudinally, parietes for the most part removed, shews the direction of the ovula of one row, and the relative situation of the groove and raphal face, no raphe exists at the time of flowering.
17. Ovulum.
18. Apex of one of the laminæ of the foliole of corona staminea.

PERGULARIA.

Pergularia minor.

Caulis scandens teres, pubescens, folia petiolata ovato-cordata acuminata basi 3-nervia, reticulatim venosa, nervo medio basi corpora 3-5 brunnea gerento; cymi pauciflori intra petiolares; pedunculo communi petiolis duplo breviore, pedicellisque pubescentibus, flores majusculi pallidi lutescenti-virides fere inodores.

Cal. 5-sepalus, sepalis lanceolatis subæqualibus. Cor. tubus longitudine fere sepalorum, ovatus teres, fauce constricta, limbus sub erectus, laciniis 5, oblonga laciniatis, marginibus revolutis æstivatione contortis. Corona staminea 5-phylla, foliolis

extrossum complanatis, apicem infra subiter in processum subulatam in super antheram incumbentem et stigma paulo superantem angustata, processis in paginæ interioris folioli prominulo (an nervo medio folii analogo.)

Antheræ membrana maxima productæ in super stigma conniventes, biloculares, loculis ratione membranæ minimis

Pollinia (Pl. CCCLXXXVI.A. Fig. XIII.), erecta oblonga vix compressa, deorsum infra insertionem caudiculæ externe breviterque product. an margo dehiscentibus. Caudiculi breves. Stigma muticum oblongum crassum, transverse sulcato, apice celluloso albido quasi fungoso. Folliculi ovato-subulati. Semina valde compressa subulata ad hilum comosa.

Embryo immaturus orthotropus. Cotyledoni suborbiculæ venosæ. Placenta multa alata alis tenuissimis.

Hab. Bengal. Legi. in sylvam ad ripas *Jellinghey prope*, 1845.

This seems to be the Pergularia minor of Andrews Repos. Tab. 85, and Asclepias pallida Roxb. Fl. Indica 2. p. 48.

Dischidia.*

1. *Dischidia Brunoniana*, Gr. Pl. CCCCX. A. Fig. 1.

Epiphytica in arborib, caulis arcte prostrata repentis et ad articulos radicantis verrucosis, verrucis apicibus, piliferis.

Fol. breviter petiolatis suborbicularis, subpeltatis abrupte breviterque acuminatis carnosis supera infera planiuscula, supera rugosa verrucosa pilosaque, umbellis intra petiolibus paucifloris pedunculis viridiscentis verucosa pilosa, foliis breviore, floribus magnis, tubo saturato-sanguineo limbo rosaceo : odor 0. Pedicellis brevib. calycibusque carneis.

* Plates CCCXC, CCCXCI, CCCXCII and CCCXIII, are illustrative of the impregnation of Dischidia. The author's remarks on the subject are here omitted as they have been recently published in the Transactions of the Linnæan Society, Vol. XX., p. 391.

Cor. urceolata 5-partita laciniis ovatis erecto-patentibus medio bases versus longitud. carnosis crassis, sinubus introsis in gibberibus productis, æstivatio valvata, fauce scabris pilosis clausis, pilis ascendentibus *medio punjentibus*.

Corona 5-phylla, foliolis stipitatis limbo subverticalis reniformis albis, fissuris hiantibus fusco-purpureis. Anth. concolores membranaceæ marginatæ terminaterque.

Pollinia erecto-oblonga valde compressa citrina, glandula brunnea, geniculis glandula superant. rubro-brunneis. Stigma apiculo longiusculo subulato.

Species distinctissime obscabritatem. Cor. lacinia erecto-patentis nec conniventissimis gibberiformis, corona foliolis marginatis reniformibus nec bilobis hippocrepidiformibus.

Hab. Mergue. Inter Rhizophoreis. Ins. Madamacam Palor prope.

2. *Dischidia (Leptostemma) coccinea*, Gr. Pl. CCCCIX.

Repens radicansque in arboribus. Caulibus in parte floriferis sæpius foliis orbatis.

Fol. (insignia) ramulos arcte circumvoluta ideoque subtus concava (ibidemque radiculos ramosas foventia) subpeltatum affixa reniformi-cordata, sinu in processum pyramido-dentiformem, superne elevato, verrucis conicis parce exasperat. supra fusco-viridescentia, subtus purpurea seniora alba obtecta.

Umbellis paucifloris.

Floribus urceolatis, tubo obtuse pentagono coccineo, limbo brevi vulvat. connivent. livide brunneo, faux annulo incomplete clausa. Coronæ foliolorum *laminæ cordatæ*.

Pollinia compressa, spathulato oblonga caudicula brevissima.

Foliculis (juniorib.) extrorsum arcuatis, *interne convexiusculis* longiuscule rostratis.

Hab. In arbor Terebinthae, Malacca. A remarkable species explanatory of Dischidia Rafflesiana, so far as the ascidia and radicles of that species are concerned.

To this genus belongs D. Rafflesiana ?

All the leaves have the same direction, and are subimbricate ;—very irregular-looking for such organs.

Spec. Char.

Foliis reniformi-cordatis, supra verrucosis in ramulis circumvolutio adpressis, sinu pyramidali, floribus coccineis laciniis brevibus rotundato-oblongis, fauce annulo semiclausa. Caudiculis polliniis spathulato-oblongis multoties breviorib.

3. *Dischidia*, (*Leptostemma*) *albidum*. Gr.

Radicans et repens in arboribus. Caulibus filiformibus.

Foliis cordato-ovatis, mucronulatis subaveniis, breve petiolatis, utrinqne (sed supra magis) convexis ideo carnosissimis, supra pallidis subtus quasi albo-brunosis.

Pedunculis subaxillaribus, perennant. petiolorum longitudin.

Floribus umbellatis, paucis, inconspicuis albis.

Cor. urceolata, limbo longiusculo valvato coniform. coniformi-connivens.

Faux villis transversis albis clausa, coronæ foliorum laminæ angustæ spathulatæ carinatæ.

Caudiculæ polliniæ æquantes. Polinia oblonga vix compressa.

Folliculis secus internum faciem profunde canaliculatis longissime rostratis fuscescent.

Semina coma tenuissim. longissim.

Hab. In arboribus Malacca, vulgatum.

Spec. Char.

Leptostemma albidum foliis cordato-ovatis, mucronatis juniorib. utrinque convexis, velustior planiusculis laciinis corollæ tubum fere æquantibus fauce villis clausa, folliculis longe rostratis.

Of this genus I have met with three species, all agreeing in habit, shape and æstivation of corolla, and peculiar shape of coronate leaflets.

4. *Dischidia* (*Conchophyllum*) *albiflorum*. Gr. Pl. CCCCX. A. Fig. 8.

Habitus et foliatio Dischideæ, Collibus foliisque præsertim subtus punctis albis, folii paginæ inferioris perforatis. The larger most conchiform leaves are purple underneath.

Caulib. repentibus in arbor. ad articulos radicantibus.

Umbellæ lateraliter inter petiolares abbreviatæ apice clavatæ, trilobæ perennantes, bracteis minutis præditæ.

Floribus breviter pedicellatis, albis, tubo corollæ subgloboso, fauce constricta, lamina oblonga, connivens, ½ the length of the tube, intus carnosa rugosa, fauce nuda nec villosa, nec annulata. Corona foliola omnium tenuissime, unguibus quite flat, laciniis planissimis simplicissimis, unguem superantibus apice dilatatis.

Anth. in conum connivent. membranaceum marginat. Caudiculæ clavatæ, longæ. Pollinia oblongia, æquantia glandula minima.

Hab. Malacca at Tabong and Verupha.

The species are difficult of discrimination, the distinguishing marks of this are its conchiform leaves, its white flowers, the rather elongated limb, the simple faux, and the simple foliola of the corona, which in all others have carinate or perhaps conduplicate lacineæ, whereas here they are plain, and in the shape of the pollinia; in this too they are longer than in the others, and their dilated toothed ends are curved outward.

Blume's Leptostemma can scarcely be adopted with propriety.

5. *Dischidia Rafflesiana*.

Foliosa ascidifera, longe scandens, ascidia grouped in large irregular often pendulous bunches, filled with ants, large irregular and variously angular on the surface, often falciform; orifice transverse, narrow, lucid, otherwise yellow green.

Lamina inflexed simple, with a recurved margin, inside

black purple with numberless white dots, occupied by roots.

The internodes of the leafy portion elongated, leaves opposite, orbicular with a short cuspis, considerably concave margins and apex incurved, above angularly rugose, very fleshy coriaceous. Peduncles stout, perennial subclavate flowering part with an irregular .surface generally much longer than the leaves.

Flowers not numerous on short pedicels erect, axis of the laciniæ ochroleucous those of the sinuses of division are dark-green.

Cal. puberulous, pale ciliolate. Cor. urceolate, tube globose, laciniæ connivent into an obtuse oblong cone: I have not seen the corolla open; after maturity the green colour disappears, the laciniæ are merely teeth, not extended, throughout, cone very fleshy and tough, slighty bearded inside, sinuses obsoletely entrant, otherwise faux naked.

Coronal leaflets with short stout stalks, armed simply incurved deflexed expanded conduplicato-carinate.

Margins of fissures communicate, thick, subcartilaginous below slightly diverging.

Anthers oblong erect, terminal membrane long flaccid forming a white termination.

Pollinia very much flattened oblong somewhat curved, 3-4 times longer than the caudicula, which is dilated at the apex and prolonged beyond the base of pollinium. Style disc pyramidal, prolonged into a beak surmounted by a white head on a level with the summit of pollinia, it is articulated on the apex of the ovary and adheres firmly with staminal columns superficies below the angles of the stigmata.

Follicles pendulous, subsubulate rather stout flat and channelled, above are the seeds (the young only seen) comose at the apex.

Hab. Malacca not uncommon on trees and rocks at Pulo Bissar also on Puddam Battoo, mount Ophir alt. 2000 feet!

Spec. Char. Foliaceo ascidif. Ascidici in bundles separate from the leaves, oblong, variously angular, margin of orifice

inflexed into a large simple lamina, with recurved margin, leaves orbicular, concave, flowers urceolate, laciniæ tooth-shaped, closely connivent. Coron. folioles dilated simply curved, conduplicate carinate. Pollinia oblong, flat, many times longer than the caudicula. Stigma rostrate, rostra cuspitate. Follicles flattened and channelled above, also known by the colour of their flowers. If not D. Rafflesiana, nominatur D. viridescens.

6. *Dischidia Rafflesiana.*

Scandens volubilis glabra, carnosa, ascidifere caulibus teretibus, ascidiis confertis oppositis brevissime pedicellatis ovatis, angulatis rugosis ad pedicellam apertis, collo substrangulato margine oris, inflexa in foramen laminæ linguæformis, intus atro-purpurea maculis minutissimis albis, radiculos ramososin pedicellis axillisque ortas foventibus, *fol. distant.!* orbicularibus carnosis plus minus apiculatis marginibus subrecurvis, nervo medio promiculo. Racemis axillaribus abbreviatis, foliis brevibus pedunculo brevissime, crasso, minute bractiato. Pedicellis filiformibus basi membranacea bracteatis pubescentibus, floribus inconspicuis luteo-viridibus.

Cal. 5-sepalus, sepalis ovatis, pubescentibus, submembranaceis, ciliatis. Cor. unceolata fauci subconstricta, limbo 5-partito, laciniis lanceolatis carnosis erectis conniventibus, intus apicem versus barbatis, *pilis simplicibus.*

Corona staminea 5-phylla foliolis lucidis stipitibus carnosis. 2-lobis, lobis membranaceis subconcavis *intus* productis: par quodque hippocrepidiforme, Sulcæ communicatæ valde prominentis.

Anth. ovatæ, marginibus apicibusque membranaceis, Pollinia erecta oblonga compressa margine diaphana, caudiculis brunneis. Stigma apiculata.

Hab. Mergue. In arboribus indiscriminat. parasit. præsert. in vetustioribus partibusque mortuis.

Corona and Pollinia, see Pl. CCCLXXXVI. Fig. VI.

Florifera Kulwing, Dec. 1834.

Nec vera Dischidia ob coronæ foliolom difformi quamvis hinc generi proximum.

7. *Dischidia complex* Gr.

Volubilis locofoliorum, ascidiis magnis, oppositis, subreniformibus, compressis, gaudet.

These ascidia are very complete, presenting a rather small orifice near the petiole, the outer margin of this orifice being inflexed and formed into a second pitcher much smaller than the outer one, opening on each side by an oblique aperture, deeply lobed or furrowed on the upper carinate or lower side, a transverse section makes it very reniform.

The cavity of the outer pitcher crammed with radicles, the inner surfaces of both lurid purple with inconspicuous white spots.

Pedunculis longis, 3-uncialibus apice dilatatis, verisimiliter perennant. Flor. breviter pedicellatis subumbellatis albidis, (ante anthesin tantum visi). Cor. tubo subglobosa, faux vix coarctata, lamina æstivatione valvata, depresso-inflexa carnosa, brevia lata ovata.

Faux pilis subclausa.

Coronæ foliol. e plicata (simplicem,) cruribus longissimis angustis apice dilatatis transverse conniventibus vel recurvis.

Columna antherarum truncat. stigma vel styli apicem 5-gonum excedens.

Pollinia subobovata, caudiculis dilatatiss. extrorsum conduplicato-concavis, basin massular. quasi ½ amplectent. margina interiore carinatis, et in mucrona ultra antheræ basin producta.

Pollinia appear furrowed along anterior faces.

Ovaria ?.

Hab. In arboribus Malacca.

A very distinct species, although in some others, there is a tendency to an inner pitcher.

Specific Char. Dischidia complex. Aphylla ascidiis subre-

niformis, compressis, lamina inflexa, in ascidia interius evolut. floribus alabast. apice depressis, fauce pilosa. Foliolis simplicibus. Polliniis antica sulcatis.

8. *Dischidia obovato.*

Scandens, caulibus teretibus, foliis breve petiolatis, obovatis, subacutis carnosis integerrimis, pallide luteo-viridescent. Pedunculis perennantibus more Hoyæ, intrapetiolaris cylindricis, crassitia pennæ corvinæ, floribus paucis inconspicuis albis. Cal. minimus, 5-sepalus, sepalis rotundatis, cor. urceolatis 5-dentatis, dentibus conniventes fere clausis, faux pilis clausa. Corona staminea simplex 5-phylla, foliolis carnosis albis, angular, basin bifidis. Anth. in conum obtusum conniventes-membrana marginatæ et terminatæ.

Pollinia 10 erecta, tumida obovata, et margine exterior dehiscent. linea diaphana nulla, tubo pollinioram tenuissima.

Stigma ovat. ad apicem angustatum obtusum.

Hab. Mergue. In arborib. *December*, 1834.

In a flower immersed in water, the dehisence of the pollinia had taken place in situ, along the outer edge of each mass. The tubes emitted were short and very fine. **See Pl. CCCLXXXVI. A. Fig. VII.**

Asclepias.

Asclepias tenuissima ? Roxb.

Glab. caulibus volubilis, foliis carnosis ovatis basi cordatis 3-nervis.

Paniculis cymosis, ramosissimus, intra petiolaribus; cymis subumbellatis, paucifloris, floribus minutas, purpurea, folliculis acuminis supra planiusculis.

Cor. notata 5-partita, tubo sub 0. Corona stam. 0. anth. membrana terminatæ, massæ polliniis transvers. affixæ, margo diaph. 0. Stigma planiuscul.

Hab. Mergue in humidis: *September*, 1834. Mergue Herb. No. 23.

Marsdenia.

1. *Marsdeniæ sp.*

Longe scandens, caulibus viridibus. Fol. oblonga, ovato-obtusiuscula acuminata, basi cordata, venis secondariis distinctis apice bifidis et ope arcuat. convexis, vena intro-marginali obsolete, subtus valde pallida, sinus baseos paginæ corpusculifer. ciliæ interpetiolares nullæ, umbellæ interpetiolares, alternantis, petiolis æquanti densifloræ, flores majusculi, viridi lutescentes.

Sepala subcordatą brevissima ciliata. Cor. campanulato tubo brevi suburceolato, limbo 5-partito, laciniis ovatis bases versus pilosis, ut etiam faux, æstivatio imbricata vix contorta.

Corona staminea 3-phylla processubus indivisis fere cordatis carnoso-gibbosis medio foveolatis. Antheræ obtusæ, margine rotundato membranaceo.

Pollinia erecta (geniculæ directione transversi) oblongo subangusto-obovata, introrsum curvata adeo ut apex utriusque in super glandulam quasi incumbit. Pl. CCCCLXXXV. A. Fig. X.

Stigma apiculo conico longiusculo ultra Antheras prominulo, apice emarginato.

Hab. Khasyah Mts. Scandens in aboribus in marginibus *Sylvæ Mumbre*: *Nov.* 11*th*, 1835. An Mardeniæ sp.

2. *Marsdenia tinctoria,* Pl. CCCLXXXIX.

Suffrutex volubilis, succo vix lactesente, habitu ad minimum ordinis.

Ciliæ interpetiolares obsoletæ. Petiola apice pluri-glandulosa, venæ seconsariæ regulariter apicem arcuatum nexæ, confluentes.

Thyrsi, modus florescentiæ insolitus subaxillares, ex umbelluliis pluribus pedunculo dispositis orte.

Inflorescentia centerpita.

Flores suave odorati, Heliotropaceo, parvi, ochroleuco-albi.

Cor. unceolati, faux pilis conniventibus clusa, tubus fasciculis pilorum 5, laciniis oppositis, ore flexis, medium versus stipatus, æstivatio imbricata.

Corona staminea 5-phylla, foliolis a medio infra carnosis filamentis adnatis, viridibus medio foveolatis, aspectu fere bicruribus, sursum liberus, linearibus, leviter canaliculatis, simplicibus, in antheris incombentibus. Antheræ membrana ampl. repand. marginatæ et terminatæ.

Pollinia erecta, spathulato-obovata, compressa, alba, areolis utrinque sub 3-seriatim dispositis, marginibus simplicibus.

Glandula solita, caudiculæ longæ spathulatæ, valde viscosæ, pollinia huic infra apicem et facie antica affixa.

Stylus nullus. Stigma fere conicum muticum.

Ovula 4 seriatim, vix ultra 14, placentæ breviter productæ, et ovula lateralia semi-obtegentes.

Coronæ stamineæ coronæ Dæmiæ subaffinis, quamvis simplex. Pollinia difficult solubilia, ob caudiculas adhærentes: non torquuntur immersione! Granula pollinis in formationem! massarum intrantia præaliis pauca. Situs massarum albi insolitus, in aliis nempe caudiculam terminans.

Suddyah: August 16th, 1836.

Tylophoræ.

Tylophoræ sp.—Pl. CCCLXXXVI.A. Fig. 1X. A memorandum of figures copied from Descaine, Paris, *Feb.* 1832.

Flower, bud, corona staminea, ovarium and section of ovarium stigma of a species from Timor. Pollinia erecta.

Sarcolobus.

Sarcolobus carinatus, Pl. CCCCX.

Volubilis scandens fol. subcoriaceis oblongis, cuspidato-acuminatis basi subcordatis, obconduplicatis, concavis parum

undulatis, valde reticulatis, reticulis inferæ paginæ quasi immersis.

Umbellis (interdum cymosim divisis) interpetiolaris vel sub axillaris, foliis multo brevior, plurifloris.

Pedicellis basi minutis bracteolatis, pedunculi paullo longioribus.

Æstivat. leviter contorta.

Cor. rotata subreflexa tubo brevissimo fauce quasi carnosa, sinubus laciniarum opposita *intus productiuscula* viridescens lineolis brunneo-striatis.

Corona stam. nana, simplex. Anth. rotundatæ, conspicui marginatæ.

Pollinia obovato-clavata subhorizontalia, caudiculis longissimis flexuosis. Stylus brevis. Stigma discoideum apice nudo albo.

Ovar. 2-l-locularia.

Hab. Malacca, in aquosis littoralibus; foliatio Habitus Gymnematis, a quo genera differt, præsertim seminibus carnosis marginatis.

Hab. Etiam ad Mergue.

Fol. juniores oblongi carinati velutino-pubescentes apice depreso mammilla exserent.

Ciliis interputiolis 0.

This is the *Bopple Sambing*, a virulent poison is produced from its seed.

If it be found to be distinct from S. carinatus it is to be called S. virulentus.

I am not certain about the stigmatic surface, for although the whole base of the style, indeed, all below the disc is papillose especially towards the ovaria, yet appearances suggest, that the tubes, will pass into the style tissue, not along outside until they reach the ovary, although from the articulation taking place on the apices of the ovaria; such a course would be anomalous. Emission of tubes in another seen, but no fecundation or penetration.

Sarcolobus, Pl. CCCCV. Fig I.

1. Flower.
2. Corona staminea. Perianth removed.
3. Ditto, Anthers turned back. Pollinia in situ.
4. Pollen mass.
5. Long section of stigma.
6. Ditto, Partial shewing that it is *stigmatic* 0.
7. Ovule, of a bud about to expand, foramen visible with the apex of the secundine projecting beyond it.

Sarcolobus, Pl. CCCCV. Fig II.

1. Corolla laid open attached to the caudiculæ.
2. Pollen masses with the tubes issuing from their ventral margin; gland fallen off.
3. Transverse section of the stigma towards its base, shewing the structure of an asclepiadeous stigma and that the pollen mass can only get access to the stigmatic tissue through the fissures in the column of stamens opposite the angles of stigma.
4. Ovule from a flower in which the pollen masses had fallen out and dehisced, but had not then entered the fissure. The apex of the nucleus is no longer visible.

Sarcolobi sp.

Caule, volubil. filiform. fol. subcarnosis lanceolato-subacutis marginibus revolutis, subtus purpureo notatis glabris floribus umbellatis, viridi-lutescentibus fusco-lineatis, umbellis axillaribus, (alternis nec oppositis) paucifloris, foliis multo brevioribus. Pedicellis basi bracteatis, ciliis interpetiolaribus 0.

Cal. usque ad basin 5-partibus, laciniis 2 exterior minor. Cor. rotata, tubo brevissimo, limbo 5-partito laciniis ovulibus subreflexis, faux, denticulis 10 potius monticulis. Cor. staminea 0, antheræ membrana marginatæ et terminatæ. Pollinia

basibus affixa transversa in stigmata incumbentia, margine diaphano O. geniculis longissimis ovarium ordinis.

An Sarcolobus? Fl. Ad humidis in sæpibus, Mergue : *July*, 1834.

Gymnema.

1. *Gymnema malayana* Gr., Pl. CCCXCIV.

Suffrutex volubilis subglaber. Caulis compressiusculus. Petiole sursum canaliculata juniores per totam longitudinem, ciliis inter petiolaribus nullis.

Folia cordato-oblonga, subabrupte et breviuscule cuspidata, basi glandulis? pluribus sine ordine dispositis stipata, integra, margine flexuosa subrecurva subcarnosa, supra saturati-viridia, subtus glauco-albida, pulchre reticulata; subtus tantum stomatosa.

Cymis composita: subintrapetiolaris pedunculo communi petiolis longiore; interdum apice umbellatim ramoso, puberulis. Cymi partialis densiflori; irregulariter pedunculata interdum subumbelliformes.

Flores parvi, (pedicellis puberulis basi bracteatis ante anthesin incurvis, bracteis minutis) ochroleuco-albidi, subodorata.

Calyx puberulus, alabastra obscure 5-gona, laciniis basi subfoveolatis.

Corolla suburceolata, laciniis erectis; æstivatione imbricatis, ciliolatis oblongis, intus flavis carnosisque; tubo breve glabra.

Corona staminea nulla.

Filamenta longiuscula, lævia obscure carinata, basi producta in laminam concolorem brevem, truncatam patentam margine leviter incurvam. Fissure fecundationis comp. deorsum continuati ad basin usque filamentor.

Antheræ rotundatæ imberbes, membrana termenatæ.

Pollinia erecta basi affixa obovato-spathulata, compressa,

margine uniform. Glandulæ majusculæ brunneæ apice truncatæ, lateribus obsolete 3-gonis, caudicula longa medio torta, parte torsionem supra fuscescento; infra, subhyalina.

Styli nulli, stigma muticum capita papilloso, celluloso albo, conum obtusum formante, superficie basis obconicæ cuticula orbata ideoque stigmatosa.

Ovar. ordinis. Ovula pluriseriata ordinis.

Vix dubito quin species sit sectiones supra citatæ; nullomodo Gymnema. Polliniaenim Gymnematis (salle in G. Sylvestra) apice pellucido coarctato gaudent.

Differt ab omnibus aliis mihi cognitis fissura fecundationis deorsum continuata, quasi completa vel aliis verbis, filamentæ sursum discreta (partibus fissuræ respondentibus) inferne *interne* tantum cohærentia.

Pollinia, ut alia in omnia, in aquam immersa inventuntur, et quoad glandulam pendula fiunt. Ab hoc anjudicare licet, positione pendula tantem naturalea esse.

Cum Gymnema occordat laciniis corollæ intus carnosis. An affinis G. Finlaysonio, Sect. 3 Wight Contr. p. 46.

1. Alabastrum just before expansion.
2. Flower: at a rather late period: I have not seen any in perfect expansion.
3. Staminal column of bud.
4. Ditto, two anthers removed to expose the situation of the pollinia.
5. Pollinia in situ (opaque and vertical view.)
6. Ditto ditto lateral.
7. Pollinia viewed in water.
8. Pollen mass and its caudicule.
9. Long section of staminal column and pistillum, base of stigma certainly has a stigmatic surface.
10. Ovulum.
11. Staminal column of bud, corolla equal to the calyx.

11*a*. Half of a gland and its caudicule. 11*b*. Pollen mass.

12. Ditto ditto corolla, twice the length of calyx.

12*a*. Gland and its two caudiculæ, now twisted and nearly perfect. 12*b*. Pollen mass.

2. *Gymnema*, Pl. CCCXCV.

Alabastra viridia, uti flores laciniæ marginibus purpurascentibus.

Caulis albido fucescens folia supra saturate viridia, subtus albida, juniora fucescentia.

HAB. In collibus *Tsa-gaiya*, on the Irrawaddy above Ava: *May*, 1837.

3. *Gymnema*. Pl. CCCXCVI.

1. Bud and natural size.
1. Do. magnified, perianth removed.
2. Anther detached.
3. Gland.
4. Pollen mass.
5. Corona staminea etc., of a bud at ½ of its development.
6. Gland of the same.
7. Flower.
8. Ditto vertical section.
9. Ditto perianth removed.
10. Ditto ditto anthers removed.
11. Pollinia and gland.
12. Long section of the ovarium and stigma.

Vellore: *August*, 1833.

CALOTROPIS.

Calotropis gigantea.

The only a normal form of this flower, is that in which there is an increased development of the processes of the corona staminea, with a corresponding increase in the anther and angles of the stigma. The greatest increase that I have seen is three, making 8 processes. In this case, between

three of those opposite the sepals, three smaller ones are developed opposite the petals. Opposed to these, three additional anthers are formed.

In the highest state of monstrosity, these additional processes are distinct, more frequently the anomal adhere either entirely or partially to the normal ones. In the latter case, the base is distinct and opposite the petal. To such, there is not an additional distinct stamen, but the stamen corresponding to the normal process is increased in size; this depends on the degree of distinctness or cohesion of the accidental process. If this is considerably developed the anther is nearly doubled in size, I have never observed impregnation in these cases.

Calotropis gigantea, Pl. CCCXCVIII. Fig. II.

1. Corona staminea. Pollinia and glands in situ.
2. Ovarium etc., in which impregnation has taken place, the tubes are seen passing from the pollen mass and entering the style; there is a manifest enlargement of the ovarium of the same side.
3. Pollen mass and tubes.
4. Portion of ditto as seen with Ross's triplet, here the external membrane does not appear divided into cells.
5. Tube separated.
6. Ovarium, the styles still adhere, but from the great comparative enlargement of the fecundated ovarium, their junction is about opposite the centre of the larger ovarium.

Calotropis gigantea, Development, Pl. CCCXCVIII. Fig. I.

First stage. Cor. shorter than the calyx.

1. Bud.
2. Long section of ditto.
3. Stamens in situ. no trace of corona staminea.

4. Stigma, the depressions on its angles visible but no rudiment of glands.

Second stage. Cor. $\frac{1}{3}$ longer than the calyx.

1' Bud.

2' Corona staminea and anthers: corona slightly developed, its processes are of a form totally different from that of the mature ones.

3' Stigma. Glands visible, arms not so.

Third stage. Cor. twice longer than calyx.

1'' Bud.

2'' Corona staminea and anthers, the fissure in the processes has closed up and the convoluted base is apparent, no traces of the 2 teeth at the upper part.

3'' Ovarium and stigma. Glands and arms developed but as yet unattached to the pollinia.

4'' Gland detached.

Calotropis gigantea, Pl. CCCXCVII. Fig. I.

1. Bud.
2. Flower, 3 times natural size.
3. Ditto Pollinia: adhering and detached.
4. Corona staminea.
5. Pollen mass with its gland. Front view.
6. Ditto lateral view.
7. Gland detached.
8. Long section of Pollen masses.

The same Pl. CCCXCVII. Fig. III.

1. Longitudinal section of the ovarium, the passage of the cord, down the base of the style is marked by a spathelated appearance, at the upper end of the cavity the pollen tubes are seen, some of them are disarranged and their extremities seen.
2. Longt. section of the placenta, the pollen tubes are seen ramified over the placenta passing down its base.

3. Ovule, shewing the communication of the tube with the ovule at the base of the funiculus.

The same Pl. CCCXCVII. Fig. II.

1. Ovarium, style and stigma. Three pollen masses are seen with the cords running down applied to the style, only one ovarium is fecundated.
2. View of the base of the stigma, the cord is seen applied to the surface destitute of cuticle, which is always opposite to the space between the anthers.

3, 4, 5, Pollen tubes at different stages of growth.

6, 7. Ovula, with the tubes communicating with them.

OXYSTELMA.

Oxystelma esculentum Br.

Asclepias rosea. Roxb. Fl. Ind. 2 p. 40.

Herba scandens volubilis inter gramines in locis humidis proveniens, glabra caulis teres. Folio brevepetiolata linearia acuminata *subtus convexa,* 1-nervia, nervo medio infra prominula, basi subbiglanduso. Racemi intra petiolares foliis breviores panciflori erecto patentes, flores basi nudi ? maximi diametro unciali inodori, extus albi. intus carnei purpureo reticulatim venosi, segmentis margine incurvis ciliatis.

Cal. 5-partitus laciniis lineari lanceolatis. Cor. rotata campanulata tubo sub o, laciniis 5-ovatis, basi latioribus patenti-erectis ; corona staminea simplex 5-phylla, foliolis basi annulatis medio ventricosis, apicibus subulam acutam gynostegio longiorem et stigmatem in super incumbentem product. lateriusinque compressis et postice interiorive planis marginatisque. Antheræ membrana terminalæ. Pollinia pendula. Glandula brunnea caudiculæ breves : massæ pollinis apicibus affixæ spathutato-obovatæ compressæ margine interiori quoad antheræ loculos valde ventricosa vel magis convexam. anguli stigmatis supra prominuli, caput vel superficies

supra peripheriam plana, centro convexo transverse sulcata vel sub-emarginata.

Hab. Bengal. In humidis vel secus rivos intra Pubua et *Shirazgunge*: *Sept.* 11*th*, 1835.

The annulus at the base of each process of the corona staminea may perhaps be considered as the rudiment of an outer series, although they are not mutually continuous in the spaces alternating with the processes. Its situation is in my opinion near Domia.

Oxystelma esculentum, Pl. CCCC. Fig. I.

1. Placenta, chief part of ovaria cut away, front view.
2. Ovarium partly cut away lateral section at least of the ovula removed, a few remain in situ. or attached by the boyaux.
3. Ovule viewed obliquely.
4. Ovule laterally.
5. Ovule obliquely.
6. Ditto lateral.
7. Front view.
8. Ditto ditto.
9. Ditto ditto.
10. All from the same placenta: 5 shews the termination of the boyaux.
10. Ovulum from a flower before expansion.
11. Ovaria some time after fecundation, lateral and longitudinal, the inflection of the septum remaining.
12. Central view of an ovule of do.
13. Ditto Dorsal.
14. The same under slight pressure.

The same Fig. II.

15. Dorsal view of ovule.
16. Central of do.
17. Longitudinal section through the greatest diameter,

shewing that the cavity is occupied by a cellular mass fixed to the *base* of the cavity.

18. Cellular body removed, from a young fruit an inch long. Coma of the seeds, ovula 5 times longer than the ovula.

Oxystelma esculentum, Pl. CCCXCIX. Fig. I.

1. Coma 8 times longer than the seed, Raphal or inner face the young seed.
2. Ditto long section through broad diameter or parallel to the faces of the seed.
3. Embryonary sac of do.
4. Raphal face in a more advanced stage.
5. Ditto Longit. section.
6. Embryo detached.
7. Embryonary sac less advanced, but from the same placenta.
8. Embryo of do.
9. Seed nearly mature.
10. Embryonary sac detached.
11. Embryo.
12. Embryonary sac less advanced.

The same Fig. II.

1. Corona staminea etc., one leaflet removed.
2. Ditto all the leaflets removed. Two Pollen masses engaged in the clefts of fecundation.
3. Lateral view of Pollinia.
4. Ditto front.
5. Ditto back.
6. Corona staminea laid open, one leaflet and one anther removed, shewing the passage of the cord, the ovaries considerably enlarged.
7. Stigma, styles and apex of ovary, shewing the passage of the cords and the place of their entrance.
8. Pollen mass, dehiscent.

9. Ditto portion of, viewed internally.
10. Ends of two boyaux.

Fecundation in *Oxystelma esculentum* is by no means uncommon. The steps being almost precisely, the same as in Asclepias. Dehiscence of the pollinia never taking place in the cells, but in the clefts of fecundation, and occurring along the convex or inner edge, with regard to the anthers. The bundles of tubes passed to the base of the head of stigma, thence being reflected in passing down its prolongation: the base and the prolongation consisting of stigmatic tissue, the outer part being almost indurated into a sort of cutis, the tubes pass into the apex of the styles or at the point where the articulation takes place, and where the styles are green and have no lax stigmatic tissue. Thence downwards to the placenta, over which they spread, proceeding most distinct to the ovula, the groove of which they enter appear to penetrate into the substance of the ovulum to a little distance from the fundus of the groove.

They are in this state almost entirely empty. Extensive sphacelation of that portion of the styles, which are not stigmatic, and into which the tubes enter, takes place, but no signs of it are perceptible on the placenta.

The ovula at the period of the attachment of the tubes have undergone no change. The nucleary excavation is generally however more evident, and occasionally appears partially filled with dislocated tissue, no raphe is visible. The excavation in its more advanced stages appears to have a communication with the fundus of the foramen. At the period when the coma is equal to the ovulum, the cavity does not bear the same proportion to the ovule that it did previously. The raphe exists, shining along an elevated line and terminating towards the centre of the ovule. The central opaque portion of the ovule is solid, but no separation of the parts appears to have taken place.

At a somewhat later period the raphe is more developed,

and the central opaque portion is occupied by a cellular roundish mass which has the same direction as the nucleus, to the base, of whose cavity it is attached. This is the commencement of the embryonary sac.

The next stage when the coma was about 8 times longer than the ovule, presents no important change in the coat of the ovule, the embryonary sac is increased in size, and is now free from adhesion except by its apex to the apex of the cavity! This attachment is very slight, it contains towards its apex a globular semiopaque body, attached by a filament of similar appearance to the apex of the embryonary sac.

The next stage presents the young seed much increased. The embryonary sac much enlarged. The embryo attached by the apex of its radicle, by a very short thread which does not reach the apex of the sac, and the cotyledons considerably developed and alternate with the raphe, the traces of the original adhesions of the sac are visible.

The next presents the raphe completely developod, terminating towards the centre of the seed and towards the centre of the cotyledons.

The embryonary sac occupies the chief portion of the seed, and it is occupied chiefly by the embryo which has assumed its mature form the cotyledons, being now nearly opposite the raphe.

Finally the sac becomes attenuated to a membrane, appearing to contain no albumen, the embryo fills its cavity almost entirely and the cotyledons become opposed to the raphe.

The remarkable parts are in this, the incompleteness of the raphe, it has in common with some others as Veronica, the late appearance of the embryonary sac, its change of attachment, and the change in the situation of the cotyledons.

Bud $\frac{1}{2}$ line long, mass not separable from the cell, I see very little analogy between the formation of the pollen in Asclepiadeæ and the ordinary forms, in the earliest stage seen the mass consist of an excessively fine sac, containing much molecular matter, either scattered or aggregated in

transverse bands or forming merely opaque dots in both cases of irregular outline. In next stage the membrane is scarcely demonstrable, bursting under the slightest pressure, it is now filled with the granular matter, which is not however grouped but continuous.

In a flower-bud 2 lines long the mass has assumed its mature form, the outer membrane is cellular, and the granular matter divided into masses, corresponding to the cells, the inner membrane now appears to exist.

No other change takes place except in induration, and the more complete development of the inner membrane.

The best mode of accounting for this formation is to assume, that the original mass, forms directly the grains of pollen and that these never lose their original connection; or we may look upon the mass as consisting of a single original cell, which subsequently becomes indefinitely divided. To this view, the only objection is the persistence of the original cells, but this point is not yet sufficiently demonstrated.

Cynanchum.

Cynanchum inconspicuum, Gr. Pl. CCCCI.

Volubilis puberulum, foliis oblongo-ovatis acuminatis, basi profunde cordatis auriculis convergentibus supra velutino-lucidis subtus albidis.

Racemis umbelliformibus inter petiolaribus, pedunculo commune petioli subæquante, pedicellisque pubescentibus excedente, calycibus puberulis. Corolla patente-reflexa, laciniis oblongo-lanceolatis, intus lutescentibus extus albidis, glabris.

Ciliæ inter-petiolares nullæ glandulæ? aggregatia ad basin folii cujusque.

Corona stam. corolla 1 brevior, 10-fida, laciniis petalis oppositis minoribus erectis emarginatis intus carina sim-

plicei auctis, alternis horizontalliter conniventibus antheras insuper integris.

Antheræ membrana cordata alba terminatæ.

Polliniæ ventricosa oblique oblonga latus interioris quoad antheras convexiora.

Caudiculæ breves lutiusculæ aspectu cellulosæ margo superus cum apice pollinia parallelus.

Glandula ovate, sulco dorso inconspicuo.

Stigmam muticum.

Ovula placentatioque ordinaris.

This species can scarcely be referred to any of Mr. Brown's sections, and it is intermediate evidently between his first and second.

It may be thus characterised:—

Sect. II. Corona staminea tubulosa, colomnam includens, ore 10-fido, laciniis 5 exterioribus petalis oppositis intus carinatis.

C. inconspicuum mihi, foliis oblongo-ovatis acuminatis basi profunde cordatis; corona st. corolla breviore, lacinis 5 exterioribus erectis emarginatis, carneis simplicibus interioribus majoribus integris antheras insuper conniventes, interioribus integris os clausentibus.

1. Alabastrum.
2. Flower lateral view.
3. Ditto vertical, corolla out of perspective.
4. Corona staminea laid open, it is evascular.
5. Genitalia, cor. st. removed.
6. Ditto an anther removed shewing the direction of the pollinia.
7. Pollinia. Portion of an insects antennæ ? caught in the furrow of the gland.
8. Anterior view of Pollinia.
9. Posterior ditto.
10. Pistillum.
11. Ovulum.

Cynanchum viridiflorum, Pl. CCCCII. Fig. I.

1. Bud just before expansion.
2. Flower perfect.
3. Columns. staminea and stigma, magnified.
4. Longitudinal section of do.
5, 6. Pollinia.
7. Inner view of anther.
8. Outer do.
9. Ovarium and stigma.
10. Ditto the pollinia in situ.
11. Transverse section of the ovarium.

Cynanchum ? Pl. CCCCII. Fig. II.

1. Flower viewed vertically.
2. Corona staminea.
3. Outer view of anther.
4. Inner ditto.
5, 6. Pollinia and glands.
7. Stigma and part of ovaria, Pollinia in situ.
8. Corona staminea. Anthers dehisced transversely. Pollinia in situ.

Toxocarpus.

Toxocarpus Roxburghii, Pl. CCCLXXXVI. Figs. IV. and V.

Scandens. Caulibus teretibus brunneis, fol. petiolatis oppositis obovato-lanceolatis, acuminatis integris, utrinque ad venas parce brunæo-pubescens infra reticulatis. Cymis inter petiolar. folio brevioribus, ramis divaricatissimi-flexuosis, floribus citrinus subsuaviter odoratis. Pedunculis pubescent bracteis minutis ovatis. Cal. æqualiter et profunde, 5-partitus, laciniis *eodem mod* pubescentibus, ciliatis. Cor. infundibul. tubo terete, calyce duplo fere longiore, limbo 5-partito, laciniis linearibus subobtusis tubo paulo longioribus, reflexis ba-

sibus parce barbatis, linea 2 barbatis, basin paulo supra confluentibus.

Stylus clavatus annulo prominulo paulo supra basin bifido. Stigmata 2, simplici. Æstivatio leviter contorta.

Corona staminea 5-phylla, foliolis carnosis 3-lobis, lobo medio majore, intus dente antheræ incumbentibus aucto. Anth. apiculatæ longitudinaliter aliterque dehiscentes, annulo styli arcte adherentes.

Pollinia ovata quaternatim, corpusculo oblongo stigmatis singulo affixa cereaceo.

Stigma apice clavata longe producta, bifida, basin vix. 5-gonum. Glandulæ oblongæ ramosæ bifidæ. Ovarium ordinis. Genus distinctissimum inter Asclepiadeas veras et Periploceasque. Asclep. longistigma Roxb.

Hab. Ad littoram Mergue: *Sept.* 1834.

Toxocarpus, Pl. CCCCIV.

1. Plant.
2. Flower just before expansion.
3. Ditto expanded.
4. Corona staminea and stigma. Cal. cor. removed.
5. Ditto, Processes removed.
6. Process of corona staminea, outer view.
7. Ditto, inner.
8. Ditto, with anther attached.
9. Part of the column of stamens, Pollinia in situ.
10. Anther before dehiscence inner,
11. Ditto, Outer view.
12. 13. Pollinia and gland.
14. Style stigma and ovary, latter cut longitudinally.

A remarkable genus, forming the connecting link between true Asclepiadeæ and Periploceæ; most remarkable for the double number of Pollinia agreeing with the former in the natute of the Pollinia, these being waxy, but 20, resembling the latter in the gland, which is emarginate.

Asclepias longistigme. Roxb. Fl. Indica.

FINLAYSONIA.

Finlaysonia obovata, Pl. CCCCVII. Fig. I.

Volubitis. Scandens, caulibus teretibus, junioribus praesertim purpurascentibus foliis obovatis abrupte acutis mucronatis integerrimis glabris *carnosis supra pilosis* subtus pallidis et pulchre reticulatis, junioribus, cymis inter petiolaribus foliis brevioribus ascendentis dichotomis pubescentibus, bracteis minutis, floribus parvis, cor. lutiscent purpureo tincta, barba alba.

Char. Gen. Cor. rotata laciniis intus barbata, faux coronata processubus subulatis; Antheras 5 oppositis. Stamina fauci inserte, libera.

Antheræ, longit dehiscent. apicibus carnosis 3-angularibus. Stigma inflexis. Massæ Pollinis 20 granulosæ obovatæ 4 antherarum cuique loculo, lividæ, egranulis quaternatim cohænentibus formatis. Corpuscula stigmatis apicibus dilatata longissime, ab apicem hinc usque ad medium fissa. Glandula carnosa subrotunda. Stigma 5-gonum apice coarctata sub bifida excavationibus transversis, 5 cum angulis alternantibus!

Cellulæ fibrosæ antheræ adsunt: etiam numerosissimæ. Textura, cellulosa laxa (stigma verum).

HAB. Scandens insuper arbores in aquosis in Rhizophorus.

1. Base of the petals with their processes and column.
2. Stigma, Glands attached.
3. Anther and Pollinia inner view.
4. Pollen mass.
5. Ditto attached to Gland.
6. Lateral view of the Gland.
7. Front of Ditto.
8. Ditto its foot.
9. Pollen shewing the quaternary division.
10. Flower &c.

Mergue Sept. 1834.

STREPTOCAULON.

Streptocaulon sp., Pl. CCCCVI.

1. Flower just before expansion (vertical).
2. Corona staminea of the same. Corolla and calyx removed.
3. Back view of anther.
4. Inner do.
5, 6, 7. Gland and caudicula, incumbent faces and lateral.
8. Do. Pollen attached.
9. Pollen shewing the ternary and quaternary division.
10. Stigma vertical.
11. Do. and ovaria.

Mergue : Sept. 4th, 1834.

MYRIOPTERON.

Myriopteron, Pl. CCCCVIII. Fig. I.

1. Bud first before expansion.
2. Flower, it becomes afterwards more twisted, the lacineæ quite so.
3. Corona staminea, sepals and base of corolla remaining.
4. The same. Anterior foliolum cut away at its base.
5. The same. Anthers all cut away.
6. Two anthers, and tube of corona staminea internally to shew the tooth in the sinus. The connective towards the base projects, and this part (if any) adheres to the stigma.
7. Pistillum and pollinia.
8. Stigma vertically.
9. Glands etc laterally.
10. Back of Ditto.
11. Pollen grains.
12. Ovary transverse.
13. Ovula.

September 1st, 1843.

Periploca.

Fruticosa longe scandens (sed vix volubilis) succo lacteo copius viscidissimo effæt. Ramulis viridis, fol. lanceolata longe acuminata, fere caudata, integra, margine cartilagineo, vena intro marginali valde distincto, ciliæ sphacilatæ intro petiolaris, glandulæ bases paginæ versus obsolitæ. Cymi axillares, oppositi dichotomi, pauciflori, foliis multo brevioris. Bracteæ lanceolatæ, minutæ, ad basin pedicillis pedunculique.

Sepala apice reflexa. Cor. rotata æstivatione fere valvata, laciniis lanceolatis intus barbatis pilis albis.

Processus carnosi subreniformes, sinubus corollæ subjecti, sinus introrsus, processum subulatum erectum apicibus mutuo conniventibis pilosum gerens.

Filamento basi connato. Antheræ supra stigmam conniventes, membranaceæ, lanciolatæ, secus centrum dorsi ciliatæ, apicibus pennicellatis acuminatis. Pollinia solitaria e granulis concervatis in corpusculo brunnea cujus caudicula elliptica, ungue brevi, glandula sub hippocrepidiforme inferne concava carnosa insidentia.

Stigma simplix muticumve Pl. CCCLXXXVI.A. Fig. VIII.

Hab. Khasya mountains Mumbree in sylvis: *Nov.* 9, 1835.

Impregnation in Periplocea, Pl. CCCCVII Fig. 11.

1. Transverse section of column below the anthers. The intervals between the anthers,* by which a direct communication can take place with the base of the stigma; the apex of the style is green and shining, particularly during the expansion of the flower, when it seems to be lubricated by muscus.

The convexities correspond to the filaments.

c. The groovesby which access is gained to the stigma.

2. Longitudinal section,

The filament cut through.

a. Space alternating with the filaments, opposite and im-

mediately beneath the glands, so that the pollinia by mere falling can get access to the stigmatic surface. *b.* The part which corresponds to the stigmatic surface, it is greener than the body of the stigma.

3. In this case fig. 3 the granules appear to be held together by something viscid, and are apparently not contained in a tube, this is applied to the foramen which is near the hilum, and which is indistinct. In the figure, it would appear as if the upper part of the ovulum were filled with these granules, the lower remaining empty: no nucleus was visible.
4. Grains of pollen, one of the component parts has burst and sent out 2 short boyaux.
5. Ovule some time after impregnation, ovarium the length of the calyx. The nucleus is distinct, the foramen is more remote from the hilum and sphacelated.
6. In this ovule a mass of dark grumous matter was applied to the foramen, but did not appear to pass into it, since it was easily detached. The first rudiments of the nucleus are visible, this is filled with granules similar to the mobile ones.

The foramen is indistinct even at a very early period; the ovula at this time appear to contain scarcely any granules. The hairs of the ovarium which are developed post anthesin are punctuated: they contain likewise plenty of green granules; but the punctuated appearance is independent of their presence, continuing after the granules have been squeezed out, they appear to be elevated above the common membrane.

8. In several instances, part of the base of the flower, and the furrows leading to the stigma, have been covered over with what appears to be a waxy secretion; it is of a whitest colour to the naked eye, the microscope demonstrates it to consist of an infinity of granules, held together by some denser medium, in all probability it is owing to a solution? of the pollen masses in

the viscous matter dissected by the furrows, see fig. 2. It slips likewise into the furrows along, which it seems to produce the sphacelated appearance: thus it likewise produces on the surfaces over which it is applied.

9. The tubes reach the ovula and become applied to the foramina in a firm manner. In the instance figured, three tubes have united into one, these together with the common one, particularly the latter close to its entrance, contain granules and what appear to be coagula. No change is visible in the ovule except a slight opacity towards the foramen. This opacity is not central. the granules do not appear to be mobile while in the tubes, when they have escaped into the water surrounding the object, they are very mobile. The motion consists chiefly of rotation on their axis, there is scarcely any locomotion. In the above, 3 tubes are not united into one as it appears from the drawing; the appearance is owing to another tube being doubled on itself beneath that proceeding to the ovula. The tubes do not appear to enter far, if at all into the ovulum.
10. Group of Pollen grains which have dehisced.

The conclusions that I deduce from the above imperfect observations are as follows:

1. That impregnation takes place (generally) by the emission of tubes which enter the base of the stigma, proceed down the style, and are ramified over the placenta.
2. That the emission takes place extra antheram, and at or about the grooves on which spaces alternate with the anthers and communicate directly with the base of the stigma.
3. That to aid this emission, these spaces are always filled with viscid mucus at the time of impregnation.
4. That the tubes do reach the ovula, and become applied to the foramina, which are situated close to the hi-

lum and which are invariably directed upwards, and in contact with the placental tissue.

5. That no nucleus is visble until the tubes have effected their ends, that a subcentral cavity appears some time after the tubes have become applied to the foramen, which cavity appears filled with granules of an analogous appearnce with those of the boyaux.
6. That the agency of insects or of any foreign thing does not appear to be necessary, since a mere falling from the anther will be sufficient to lodge the pollinia in the desired place.
7. That sphacelation about the grooves is very general, but that it does not take place along the styles.

Addenda: That the discoid head of the stigma is very readily separable from the base, that the passage of tubes to the ovula does not appear to be essential, as in by far the greater number of cases I have not been able to trace them in the placenta, although a section of this demonstrates it to contain abundance of mobile granules, that these or analogous granules appear to abound in the ovula after impregnation that they do not move while in the tubes, but are very rotatory when freed from restraint.

Mergue: *November* 21*st*, 1834.

APOCYNEÆ.

ECHITES.

Echites.

Frutex scandens volubilis ramulis compressis ciliis interpetiolaribus, majusculis, fol lanceolatus acuminatis subtus albido-glaucis, et reticulatis cymis axillaribus alternis, foliis ut plurimum brevioribus, bis dichotomis, floribus albis, suave odoratis. Sepala 5, ovata. Cor. hypocraterif. tubo medium paulo infra ampliato, parte ampliata lacinus, opposite sulcata, laciniæ 5, subobovatæ, torte radiantes, basi ut etiam faux pu-

bescentes, inequilaterales. Stam. inclusa, tubi partis ampliatæ basi inserta. Filam sursum incrassata tubo omnino adnata.

Antheræ sagittatæ in conum stigma circa conniventes hincque adhærentes, apices versus tantum polliniferæ.

Connectivum pubescens, margine supero introrsu libero. Pollen læve simplex.

Glandulæ 5 hypogynæ lineares carnosæ, truncatæ, 2 anticæ sæpe an semper supra coalitæ, sepalis alternantes. Stigma conicum basin cum antherarum cono solubile! Ovula ordinis, sulco angustissimo.

Hab. Ad ripas Burrumpootur, *Selonemookh*: *April 5th*, 1836.

Sp. char. Ciliæ plurimæ varie coalitæ magnæ intra sepala glandulasque an vero ciliis analogæ, cur non glandulis. Stigma medio constricta parte infere rotundatum supera conicum 5-gonum, apice bimucronatum, stigmatis partis conicæ basis tantum stigmatosa, cellulis laxissime dispositis. Vasc. fasc. styli 2. Pl. CCCCLVIII. Fig. 3.

2. *Echites odoratissima.*

Scandens, ramulis subcompressis, fol. oblongo-lanceolatis, subacuminatis integerrimis glabris, coriaceis, nitidis, ciliis intrapetiolaribus stipatis. Cymis paniculatis densiflorus paniculis terminal. Bracteis ciliatis, floribus parviusculis albus, odore suavissimo. Pedicellis calycibusque extus breve pubescent.

Cal. 5-sepala. Cor. hypocraterif. tubo basi subampliato, laciniis 5 ovatis obliquis leviter contortis fauce nuda, angulis 5, laciniis alternantibus in tubum decurrentib. Stam. basi corollæ inserti, angulis opposit. filam brevissime, basibus sanguineo-purpurea. Anth. sagittatæ apiculatæ stigmati adhærent. et omnino obtegent. loculorum bases sterilis. Stylus brevissimus, stigma oblongum bifidum antheris arcte amplexam. Ovar. 2, discreta 1-locularia, placenta 1-parietali, ovulis pluribus.

Glandulæ 5 hypogynæ inæquales oblongæ sæpissime integræ, ovarium basin cingent.

Hab. Mergue. In sylvis *Beiklow*: *Jan*. 1834.

Vallaris.

Vallaris. Assameusis Gr.

Scandens volubilis ? fol. breviter petiolatis elongato-lanceolatis acuminatis subrepandis glabris. Racemis axillaribus pubescentibus, compositis, subcymosis, floribus magnis sub infundibuliformibus albis, tubo brevi, sepalis lineari-oblongis, inæqualibus, 2 exterioribus majoribus, gibberribus antherarum globosis albis lævibus, filamentorum sinnubus pubescente pilosis, ut etiam introrsum.

Folliculi ovati, attenuati, lignosi, bivalves, valvis demum solubilibus cymbiformibus. Placenta soluta, cum valvis separante. Semina pauca ad umbilicum carnosa coma facile separabili, intus plana, extus convexiuscula, apice angulata pressione sublente celluloso-rugosa pallide brunnea, tegumentum exterius cellulosum interius tenuiss. membranaceum, albumen parcissimum.

Embryo axilis albis, cotyledones magnæ carnosæ planiusculæ, radicula supera, hilum versus brevissimam teres.

Plumula inconspicua.

Hab. Assam, in sylvis *Bishenath: March 20th*, 1836.

Glandulæ hypogynæ connatæ in urceola, 5-crenatum, crenulis cum sepalis alternant. vix Echites dichotoma, Roxburghii obformum sepalorum.

2. *Vallaris dichotoma.*

Frutex, ramis teretibus cinereis ad nodis articulat. Ciliis inter petiolaribus nullis : foliis breviter petiolatis oblongo-lanceolatis acuminatis repandis. Racemis terminalibus axillaribusque. Pedicellisque velutinis. Bracteis lanceolatis foliaceis, floribus majusculis, albis, odoratis.

Sepalis 5 ovatis foliaceis, velutinis, patentibus. Cor. infund. rotato-campanulata, tubo ratione limbo brevissimo, 5-partita

laciniis rotundatis æstivatione contortis. Stam. 5 fauce inserti omninoque obcludentia exserta, filam. brevia intus pilosis apicibus in processum album orbiculatum gibberemve ampliatis. Connect. pubescens discreta. Anth. sagittatæ, loculis superne tantum polliniferis stigmato arcte cohærentibus. Stylus filiformi-piloso pubescens. Stigma conicum viride. Cupula glandulosa profunde margine breviter 5-loba pubescensque ovar. omnino ambit. obtegitque. Ovaria apice pubescens. Pollen læve and angulare.

The affinities of this plant is on the limits of Apocyneæ and bordering on Asclepiadeæ, to which at first sight it is referable from the appearance of the male organs, judging from this genus, I take the processes of the corona staminea of Asclepiadeæ to be processes of the filament. They are hence essentially pentandrous.

Strophanthus.

Strophanthus pentaphyllus Gr.

Frutex robustus scandens, ramulis brunneo-purpurascent. cortice tenacei, succo sublactacent coagulabili.

Folia 2-2¼ breve petiolata long. 3½ lat. petiolus 2½ 3, linealis subelliptica breviter et subobtuse cuspidata basi subito attenuata, juniora præsertim conduplicata, maturiora pauce undulata venis secondariis distinctis et distincti arcuatim nexis utrinque sed præsertim subtus, paginæ inferioris intervenia dendroideo-reticulata, venulis anastomosantibus minime prominulis.

Cilia ad basin petioli in utroque latere subulata stipulas rudimentarias omnino mentiente,

Inflorescentia terminatis e cymis dichotomis 2, floris conflata aperta foliorum circiter longitudine, ramis articulatis. Bracteæ lanecolato-ovatæ membranaceæ aspectu brunnescentes, 1 subtus ramulum quemque, 2 minores oppositæ ad medium pedicellorum *extimorum* (*i. e.* cymorum partiatum quorum ramulus alter semper ? abortiens). Pedicelli 3-4 lineales sepala colore bractearum e basi cordato-ovata acuminata, subcarinata.

Corolla ampla campanulaceo-infundibuliformis ; tubus sulcis tot quot sepala et his oppositis 8-9 linealis medium supra subito ampliatus albus, maculis striatutisve purpurceis laciniæ e basi cordato-ovata acuminatissimis, caudis nempe 5-6 uncialibus canaliculatis tortis, color laciniarum saturate brunneo-sanguineus. Squamæ albæ, latæ ad medium bipartitæ laminas laciniarum subæquantes in tubum decurrentes usque ad partem constrictam, tubo intus albo-lineis purpureis 5 squamis alternantibus.

Stam. ad tubi constrictiorem exsert. squamis opposita : filamenta libera breviter $\frac{1}{2}$ linealia, puberula, gibbere obclavato puberulo e medio partis adnato vel carina obtusa deorsum majore.

Antheræ obtuse vel auriculatem sagittatæ, medio-stigmati adhærentes. Caudæ 4-5 longiores conniventes, antheris 3-4 longior. loculorum media superiora tantum pollinifera.

Stylus clavatus bisulcatus rugosus stamina subæquans basi purpureis. Stigma demidium inferius viscosum annuliforme superioris apiculiforme ad basin bipartitum.

Ovarium album subrotundum apicem versus utrinque profunde subsulcatum, fere bilobum, biloculare glandulæ dentatæ, ciliiformes inter corollam et ovarium.

Placentæ revolutæ, pagina exteriore undique ovulis obsita.

Folliculi maximi divaricatissimi, immatur. succus aquosus subviscosus copiosus demum sublactescens cito coagulans ; semina utrinque sed præsertim apice cornosa.

Sp. Char. Strophanthus, scandens, foliis ellipticis breve cuspidatis carnosis, floribus amplis, caudis longissimis, corona e squamis 5, ad medium bipartitis, corolla infundibuliformi, folliculis maximis, divaricatissimis, obtusissimis.

Hab. Belookor Jungle, Malacca, flowers throughout the year.

The points of the flower buds are not much exserted before the calyx has reached nearly its mature size, they are at first whitish ; but become soon blackish purple, they are

twisted from right to left; after anthesis they become more red.

The glands round the ovarium represent the interpetiolar glands; if they have any disposition it is in pairs or sets between each sepal, but even this is not over apparent.

The tail of the filament has a central vascular fascicle, the continuation of that of the filament itself.

The scales are also vascular, and apparently derive the fascicles from the parts of the corolla to which they adhere. The exterior fascicles are the largest, and the others gradually diminish towards the centre which is very short.

This can scarcely be Loureiro's plant, as the corona is different, indeed it appears to differ from all in 5 leaved corolla.

Spirostemon.

Spirostemon spiralis Gr. Pl. CCCCXI. Fig. 1.

1. Flower before expansion.
2. Do. opened.
3. Stamen separated inner view.
4. Hypogynous glands ovarium etc.
5. Seed natural size.
6. Do. long section.
7. Stamens, corolla circumcised just above their attachment.
8, 9. Outer and lateral view of anthers and upper part of filament.
10, 11. Outer and lateral of the connectivum—an *Parsonsia.*

Cryptolepis.

Cryptolepis Buchananii.

Frutex scandens, glaber: fol. breviter petiolata oblonga, breviter acuminata supra lucida subtus glaucescentio, vena

primaria purpurascente. Glandulæ basilares 0. Ciliæ intra petiolares breves. Cymis axillaribus dichotomis, folia excedentibus, alternis, nec oppositis, paucifloris. Floribus majusculis, ochroleucis.

Cal. 5-sepalis, sepalis ovatis, basi incrassatis post lapsum corollæ conniventibus. Cor. tubo calyce duplo longiore basin versus subampliato, limbo profunde 5-partito in lacinias 5 lineares revolutas, subcontortasque æstivatio contorta.

Corpora 5 glandulosa, antheriformia, fundem tubi versus inserta, antheris super imposita laciniisque alternantia in basibus tubo adnatis. Filam. totidem, laciniis alternantia, brevissime basibus corporum inserta.

Anth. subsagittatæ biloculares longitud. dehiscent. loculis omnino anther polliniferis.

Connectivum subulatum, subglandulosum pallide virides-cens, loculi pariet. exteriori demissius product.

Pollen globosum vix farinaceum, in lobulis vel massis nec digestum. Granulæ compositæ e 3 vel 4 adnatis, membrana simplex, granulas minutas continens (raphidibus immixtis ?)

Ovaria ordinis. Styli 2 breves. Stigma angulis 5 prominentibus, apice conicum corpuscula dilatata spathulata, pollen colligeis, secus angulos stigmatis applicita spathulatæ clavatæ, dimidium superius pollinifera, inferne glandula exsulca albida mucosa, affixa.

Genus secus Brown Asclepiadeas Apocyneasque intermedium. Cryptostegiæ ob structura et adhesione pollinis affinis.

Pollen, pollen-mass, and caudicula. Pl. CCCCX. A. Fig. 4.

Wight Contr. to India Botany. p. 64. et Arnott. sed Streptocaulon, Cryptolepis Buchananii ad Apocyneas referunt, ut etiam Bartling, p. 204.

Calcutta: June 11*th*, 1835.

Wrightia.

Wrightiæ sp., Pl. CCCLXXXVI.

Arbuscula vel frutex.

Ramulis compressis pubescenti-velutinis viridi-fuscescent. fere ferrugineis.

Fol. saturate viridia, tactu mollia subtus præsertim pubescentia pallida, venis secondariis arcuatim nexis, vel intromarginali inconspicua.

Cymis terminalibus plurifloris, alabastra tubo lutescente, cæterum viridib.

Flores majusculi ingrati odorati, tubo luteo, lamina intus viridi lutescent. laciniis reflexis, squamis 10, 5 exter sepalis, oppositis, minor internis pet. opposit. majoribus, utrinque processum setaceo capitato stipat. aurea.

Antheræ conniventes in conum stig. obtegens toto, albido fuscæ, apice tantum polliniferæ.

Æstivatio contorta, vernatio applicit.

Succas lacteas.

Hab. Malacca Tagoung, in sylvis.

Strychnos.

Strychnos nuxvomica. Pl. CCCCXI. Fig. II.

Flowers all bibracteolate, hence the cymes ought to be much more compound than they are: it differs a good deal from the usual form of Apocyneæ, especially in its valvate corolla, and its stigma.

India contains several species: five of which I know.

Ovula as in Asclepiadeæ, but the groove is indistinct, the penetration of the boyaux into these, I have seen very distinctly. Sphacelation only takes place at the apex of the style and stigmatic canal. The tubes are of considerable length, irregular, generally empty, and much choked with coagula.

The actual continuation of these tubes from the pollen to

the ovula is not easily shewn, but indirect proofs are very satisfactory: viz., the resemblance of the part attached to the ovula to the upper part or that proceeding from the grain: 2nd the non existence of any tubes in the stigmatic canal before the application of the pollen to the stigmatic surface.

The stigma in one instance was 3-lobed, and as the lobes were equal, I consider this indicating a tendency towards the formation of other carpellary leaves. Had they been unequal they might have otherwise been accounted for.

1. Alabast.
2. Ditto just expanding.
3. Flower.
4. Corolla laid open.
5. Anther back view.
6. Anther after dehiscence.
7. Pollen $\frac{1}{2}\frac{1}{0}$ (iterum exam).
8. Pistillum and calyx.
9. Pistillum, calyx removed.
10. Stigma (accidental) almost always bilobed.
11. Ovary transverse section.
12. Ovulum, with boyau attached.
13. Pollen with its boyau broken.
14. Pistillum laid open shewing the mode of fecundation.

Bamo: April 29th, 1837.

2. *Strychnos laurina.*

Scandens, foliis oppositis breviter petiolatis, oblongo-lanceolatis integris obtusis, 3 nerviis, vere 5, (2 lateral indistinctis) paniculis florum axillarib. terminalibusque, thyrsoideis dichotomis.

Cal. 4-5 partit. Cor. tubo globoso breve, limbo 4-5 partito laciniis reflexis, barbatis, faux barbata. Stam. tot quot pet. iis altern. fauci inserta. Anth. erectæ biloculi longit. dehiscentes. Stylus subulatus pilosus longitud. corollam paulum superant. Stigma capit. Ovarium pilosum, superum

bilocul. pluri-ovulat. placentis incrassatis foramen hilum prope. Stipulæ interpetiolares, caducæ linear.

Vel Rubiacea ovario supero vel Apocynea stipulis interpetiolaribus. Rubiacearum sed ovarium superum.

Hab. Mergue. Ad ripas Kyouktag : *Aug.* 1834.

Euthodon. *An novum Genus.*

Gen. char.

Cor. subinfundibulif. laciniis 5-ovatis, æquilateralibus erectis, faux esquamata. Stamina fauci inserta, sub exserta. Anth. sagittatæ. stigma amplectentes. Cupula hypogyna 5-fida ovarium cingens. Stylus fusiformis. Stigma falciforme. Ov. bilocul.

Æstivat. corollæ valvata. Frutex scandens foliis cordato-ovatis, ciliis interpetiolaribus 0. floribus paniculatis succus quosus.

Euthodon paniculata Gr., Pl. CCCCLVIII. Fig. 2.

Frutex scandens, ramulis, petiolisque velutinis : fol. oppositis petiolatis cordato-ovatis, subacuminatis, obtusis, glabris subtus pallidis. Inflorescentia paniculata paniculis terminalibus ramosis, ramis divaricatis, trichotomis, velutinis, florib. numerosis pallide, tubis saturatius carneis. Cal. parvus, 5-dentatus, dentibus basi carnosis. Cor. gamopetalis tubo calyce multo longiore, 5-sulcato, sulcis dentibus calycinis oppositis, fauce glandulis 5 in sinus petalorum, limbo 5-fido, laciniis ovatis conniventib. Stam. 5-petalis alternantia, fauci libera facta. Filam. subulata rubescentia, intus pilosa. Anth. sagittatæ, apicibus inter se et cum stigmata cohærentia poro terminali dehiscentes.

Ovarium 2-locularia, pluri-ovulatum, placenta axili parietali. Cupula 5-fida, eglandulis 5 persistentibus, antheris subconformib. dentibus calycinis alternantibus format. Stylus

fusiformis crassus. Stigma mitræforme *integrum*. Æstivat. corollæ valvat. succus aquosus nec lactescens. Ciliæ interpetiolares. Bracteæ ad basin pedicellor. ramulorumque.

HAB. In sylvis, Mergui: *August*, 1834.

WILLUGHBEIA.

Willughbeia javanica.

Frutex robustus scandens ope ramis unciformibus interdum subvolubilibus aphyilis, caule ramisque purpureo-nigrescentibus, novellis brunneo-purpurascent. lenticellis pallidis stomæformibus sparsis. Succus lacteus copiosus.

Folia subopposita, breve petiolata, lanceolata, ut plurimum anguste, longit. $3\frac{1}{2}$-4 uncialia, latit. 10-12 linealia, coriacea, obtuse cuspidata, supra late viridia subtus glauco-albidescentia; venis utrinque sed præsertim infra pinnæformibus leviter arcuatis, margines versus sæpius dichotomis cum contiguis concorrentibus; interveniis supra convexiusculis.

Cymæ subracemiformes petiolorum paullo vel vix excedentes, in una vel axillis ambabus, ramis abbreviatis inferioribus bi-tri-floris, superioribus unifloris, puberulæ.

Pedicelli sublinealis, laterales basi bracteati. Calyx minutus 5-sepalus, sepalis oblongis.

Corolla subhypocrateriformis, tubus intus piloso-pubescens præsertim faucem versus, calycem prope inflatus, iterum angustatus $\frac{1}{2}$ tortus, 5-linealis, lamina e laciniis 5-linearia spathulatis obtusis, tubus subæquantibus, ob tubi torsionem quasi obliquis.

Faux angusta pilis fere clausa. Flores majusculi, subingrate odori, tubo carneo fuscescente, lamina alba.

Stamina ad medium tubo partis inflata, filamenta brevissima connectivum lutescens subobconicum. et horizontaliter affixum filamento, vel filamentum cum connectivo geniculatum. Anthera bilocularis acuminata, calcaris rudimentum

basin locula utriusque, loculi omnino fertiles. Pili pauci ad basin filamentorum, glandulæ hypogynæ nullæ, ovarium brevi cylindricum ad stylum ita constrictum ut fere truncatum est.

Stylus brevissimus. Stigma ovario paullo longior, dimidium inferius subovatum, superius cuspiforme, bilineatum longitudinaliter, emarginatum Ov. uniloculare, placentis 2 parietalibus ovula pauciuscula.

Fructus maximus, pyriformis, 7-8 uncialis long. latit. sub 5-uncialis glaber, succo lacteo per scatens, demum baccatus. Semina nidulantia in tela cellulosa carnosa alba, tegumentum simplex, brunnescens, locellis fructus adhærens. Embryo ideo tegumento proprio orbatus, magnus, ruber. Cotyledones basi bi-auriculatæ carnosissimæ, sæpius oblongæ. Radicula brevis, vaga, auriculis cotyledonum obtecta.

Hab. Malacca. It is the *Akkur Jitong of the Malays*. An Wilughbeia Javanica Bl. D. C. Pr. 8, p. 321.

Judging from the characters it differs from all in the subbasilar inflation of the corolla, and size and shape of the berry.

In the specimens both branches and ramuli are cirrhose or rather the cirrhiferous (unciferous) branches bear nothing else. The hooks are generally emarginate at the ends: representing the young bud state.

The older leaves are dark-green above, very coriaceous, the interveins underneath obsoletely reticulate.

GENTIANACEÆ.

1. *Gentianæ* sp. Gr., Pl. CCCLXXXIV. Fig. I. It. Notes p. 122. No. 383.

2. *Gentianæ* sp. Gr., Pl. CCCLXXXIV. A.
Hab. Bootan.

Mitrasacme.

Mitrasacme crystallina, Gr., Pl. CCCLXXXIII. Fig. II.

Cal. tubo brevi angulato, paulo ultra medium 4-partitus, laciniis lanceolatis acutis subæqualibus. Cor. tubo sepalis $\frac{1}{3}$ breviore angulato? limbo, 4-partita, laciniis ovatibus obtusis sepalis alternantibus æstivatione imbricatis.

Stam. 4 subæqualia laciniis corollinis alterna, inclusa. Filam. cellulosa fasciculo centrali vasorum pertenui. Antheræ, ovatæ basi subsagittatæ posticæ. Pollen læve.

Ovarium biloculare, placentis 2 carnosis *medio* septis affixis ovula 00. gerentibus. Stylus basi bifidus, apice continuis sed solubilis. Stigma subbilobum capitato-papillosum.

Capsula membranacea calyce incluso, apice exserto, tantum. Stylo stigmateque persistente coronatum, inter fissuras stylo bases dehiscens, bilocularis, polysperma. Placentæ e septis solubiles! deciduæ semena 00. (immatura) oblonga vel rotunda, testa carnoso-cellulosa, corpore nucleo opaco continens, *maturiora* pallide cinerea, testa areolata, albuminosa. Embryo minimus.

Herba pussilla, erecta ramosa, omnibus partibus crystallino-cellulosa. Fol. basi connata lineari-lanceolata acuta. Pedunculi graciles solitari vel gemine in axillis foliorum (non opposito). Flores inconspicui albi. Antheræ luteæ.

Hab. Bengala Paulo infra *Jumalpore*: in arenosis. *September* 15*th*, 1835.

The ovula resemble much in form those of Asclepiadeæ and (all?) Apocyneæ, that is, they present, when half developed, no traces of distinct coats. They appear to be destitute of the groove first described by Dr. Brown, as existing in Asclepiadeæ and most perhaps in all Apocyneæ. The part corresponding with this groove is somewhat papillose and to its apex, the pollen, tube becomes applied. These tubes appear rather empty, I could not trace them down the style. In two cases I observed them applied to the ovula, and in one or two more passing over the placenta: I can state nothing as to

whether they penetrate the substance of the ovulum or not, but the adhesion is sufficiently firm. The first change that takes place in the ovula after their application, consists of the outer or peripheriate tissue becoming more distinct and cellular; and in the production of a linear sub-irregular opaque line in the centre of the ovulum and in the direction of its longest diameter. On submitting ovula in this state to pressure, the only means by which, owing to their extreme minuteness and softness, they can be analysed, they appear like vesicles filled with gelatinous fluid.

Villarsia.

Villarsia cristata. Meryanthes cristata, Roxb. Fl. Ind. 2, p. 28.

Cal. 5-sepalus, sepalis lineari-lanceolatis. Cor. subrotata, 5-partita, laciniis oblongis, margine crispato-undulatis medio crista elevato eâdem consistentiâ crispato undulata laciniis basi barbatis stipata. Stam. 5, sinubus corollinis inserta, semiexserta, Filam. brevia: Anth. erectæ biloculares, introrsæ. Stam. sterilia 5, basibus laciniarum corollæ inserta, breve stipitata, apice penicillata, luteo-aurea.

Glandulæ hypogynæ 5, staminibus alternantia carnosæ, aurantiaceæ, barbato-ciliatæ. Stylus 0. Stigma bilobum, lobis anticis et posticis ? cordato-ovatis. Ovarium ovatum 1-loculare, pluri-ovulat. Ovulis placentis 2 parietalibus (right and left) ? affixis, foramen hilum prope anatropis. Capsula membranacea.

Semena (immatura) orbicularia compressa echinulata.

Herba nutans in aquis stagnant. basi humi affixa vel. nec. Fol. cordata, integra. Flores terminales aggregati solitarii in pedicellis: majusculi albi, tubo intus luteo. Pedicellis post antheram immersa ob deflexionem.

Pl. CCCLXXXVI.A. Fig. XII.

a, a, a, a. Sepala.
b, b, b, b. Petala.

c, c, c, c, c. Stamina.
d, d, d, d, d. ditto sterilia epipetala.
e, e, e, e, e. Gland hypogyne.
f, f. Stigmata 2-lobi.
g, g. Placentæ.
The above is taking the 5th sepal as posticous of which I am not certain.

Hab. Bengal prope, *Jumalpore*: 18*th September*, 1835.

Villarsia glandulosa, Pl. CCCLXXXV.

Cal. æstivatione imbricatus.

Cor. gamopetala, tubo brevi, rotata, laciniis vasculorum fasciculis 3-donatis, sinubus evasculosis.

Stam. 3-seriata, 5 extima tantum fertilia tubo apicem versus inserta, filam. filiforme per totam fere longitudinem corollæ, adnata evasculosa! serie interna petalis opposita. Antheram loco pili cellulosi breves directione varii, serie intima eglandulis 5, petalis, oppositis hypogynis, apice ciliatis.

Auth. biloculares basin versus affixæ, longitud. dehiscent.

Pollen.?

Ovarium 1-loculare. Stylus brevis crassus, apice bilobus, lobis cordatis. Stigmata leviter papillosa marginem loborum occupantia.

Placentæ 2 parietales, cum margine loborum styli continui vel oppositi. Ovula plura bi-triseriata *antitropa*, (foramen hilum prope), tegumentes cum nucleo concretis.

Obs. The only objection existing against Parnassia belonging to this group, exists in its polypetalous corolla, and albuminous seed. In the latter not much stress is to be laid, as the albumen is scanty.

To the former in my opinion little value is to be attached, as there is an evident tendency in Villarsia to become polypetalous, as indicated by the short tube, and the evascularity of the sinuses, more stress should not be laid on its being a

polypetalous form in a monopetalous order, than its being a non-adherent form in a usually adherent order.

The fact of the opposition of the lobes of the stigma in Parnassia, although of less value, still is deserving of more consideration. It depends entirely on the assumption of the stigma being the denuded apex of the midrib. I say an assumption, because the idea seems to me totally wanting in some instances.

Long ago the observation of a monstrous variety of Melilotus rendered it evident to me, that the stigmata form in no case a single organ, if carpellary leaves are continuations of the placentary margins.* The proof derived from a monstrosity is however unnecessary, for instances are not wanting, in which there are two stigmata obviously continuous with or opposite to the placental margins, some species of Phyllanthus, Nymphæa, and all filiform stigmata longitudinally sulcate, shew this fact to demonstration.

It follows therefore that all stigmata, at least the distinct portions, are opposed to the placentæ. The question then arises, from what cause does their opposition as a whole originate. This is easily answered, parts of a vegetable may cohere either with contiguous parts of the same organ, or with contiguous portions of two different though similar organs. Let us take Parnassia for instance, we have 4 stigmata, and 4 placentæ, hence the number of stigmata is 8. If the union of these take place in such a manner, that the two stigmata of one carpellary leaf cohere mutually, then the stigma will probably appear to be a termination of the midrib. But if two stigmata of two contiguous carpellary leaves combine, we shall obviously have one opposed to the placenta. And that such is the case there can be no doubt; the fact of the almost universal communication between the stigma and placenta cannot be explained by the old theory; neither need we have recourse to the destruction-

* Notulæ, Part I., p. 128.

of a portion of cellular tissue, nor the formation of a fresh tissue. As the placental tissue is the most lax part of the carpellum so are the stigmata.

No objection can be raised to the idea of union given above, it is not of uncommon occurrence in most parts of the flower, it is of very common occurrence in fruit, and latterly I have shewn it to exist in anthers; Mr. Lindley alludes to this union as giving one explanation of the structure of Cruciferæ, and it is the most probable one. I may here observe that in perhaps all cases very great assistance is obtainable in anomalous instances of union, particularly between stamina or styles by taking into consideration the number of vascular fascicles. Thus the composition of the stamina of Eriodendron anfractus is at once pointed out by the number of vascular fascicles. It is of still more universal application to styles, the number of fascicles either corresponding directly to the number of carpella, they being in this single, or if there be more than one to each carpella, they are grouped according to their respective carpella, I am not aware of a single instance tending to diminish the value of this test. It is of difficult application in some instances, but the days are past for the minuteness of a flower being an excuse for not accurately ascertaining its structure.

If a floating Parnassia be ever found, it will probably be found to have evalvular capsules, because this is the case with Villarsia.

I therefore propose the order of Villarsiaceæ, which will include Menyanthes, Villarsia, and Parnassia.

Cal. 5-sepalus æstivatione imbricatus, persistens. Cor. gamopetala, in Parnassia polypetala. Æstivatio imbricata, laciniis cristatis vel barbatis, raro nudis.

Stam. fertilia 5, sepalis opposita, in polypetalis hypogyna.

Stam. sterilia 5, vel 10, serie intime hypogyna, exteriore petalis opposita.

Ovarium liberum, 1-loculare. Placentæ parietal. 2-3-4.

Ovula plura.

Capsula (in aquaticis evalvis) bi-quadrivalvis loculicida, polysperma.

Herbæ aquaticæ vel paludosæ.

Folia simplicia, cordata in Menyanthes trifoliata.

Inflorescentia terminalis, floribus aggregatis vel paniculatis, flavis vel albis.

Pladera virgata ?

Caulis 4-gonus, 4-alatus.

Herbacea dichotoma erecta ramosa, glaucescens.

Folia opposita sessilia 3-nervia cordato-ovata, acuta, integerrima, inferiore lanceolata, 5-nervia acuta, repanda.

Pedunculi terminalis axillaresque plerumque biflori.

Pedicelli ad medium bibracteolati. Cal. tubus striatus, limbus 4-dentatus, dentibus subulatis.

Cor. tubus calyce paululum longiore, limbus 3-lobus, lobo postico vel superiore majore bilobo e duobus connatis formato, reliquis ovatis æqualibus. Stam. 4 ad faucem inserta. Filam filiforme, 1 longius exsertum in plicam laciniæ corolla superioris latens, 3 breviora vix exserta, petalis alternantia. Anth. filam. longioris, major, aurantiacea, fertilis, 3 reliquæ pallidæ sterilis ? minoresqus. Ovarium cylindricum, 1-loculare, placentis 2 linearibus parietalibus. Ovula 00. Stylus filiformis. Stigma 2 fid. intus papillosum.

Variat. maxime quoad statura.

Hab. In muris etc. *Amherst* et *Molamain*: *December*, 1833.

Crawfurdia.

Crawfurdia fasciculata.

Caule scandento volubil. fol. ovata vel lanceolata basi 3-nervia, floribus axillaribus breviter pedunculatis, vel axin continuis, subracemosis, oppositis, magnis, infundibuliformis cæruleis, parte tubo æstivatione externa livida. Calyx 5-alatus carinatusve, laciniis subulatis. Cor. æstivat. conatri-

plicata infundibulif. 5-partita, laciniis breve latique cuspidatis crectis. Stam. 5, inæqualia, his alternantia, inclusa. Styuls filiformis, stigmata 2 inclusa, cornuum more revoluta. Cupula hypogyna 5-loba, lobis cum staminibus alternantibus, ovarium 1-loculare: placentis 4-parietalibus utrinque, lineæ septo situm indicantis ; ovula marginata, breve funiculata, vel 3-alata, alis 2-parietibus proximis brevioribus.

Variat foliis latioribus purpureo tinctis.

Hab. Khasyah Mountains. In dumetis humidis, no. 40 *Churra*: *October* 12*th*, 1835.

Exacum.

Exacum sp.

Herbacea annua erecta spithamæa 3 pedalisve, Caule 4-alato ; fol. oblongo-lanceolatis acuminatis basin connatis quin. tuplinerviis. Paniculis axillaribus, cymosis, floriferis foliorum longitudine, pedunculis medio bibracteata, floribus erectis conspicuis saturato-virideque azureis. Sepalis 4 dorso carinatis. Corollis subrotatis 4-partitis, laciniis ovatis acuminatis staminibus fauci insertis ; filamentis autheris subsagittatis, semper rectis apice poro geminato dehiscentibus aliquoties brevioribus. Stylo filiform. staminibus duplo longiore,subdeclinato stigmata oblongo viride. Ovarium biloculare, placentis 4, vel bi-solubilibus, carnosis stipitatis, ovulis indefinitis. simplicibus.

Capsula chartacea ovato-rotunda. Calyce ½ corollæ tubo omnino inclusa, limboque genitalibusque persistentibus coronata bilocularis bivalvis, septicida placentis nempe septo post dehiscentium parallelis. Semina 00. minuta pallide brunnea angulata minutissime rugosula

Placentæ virides carnosæ demum liberæ basi (utriusque loculi) integræ cæterum ut etiam in ovario bipartitæ

Tegumentum duplex utrinque membranacea externum, pallide brunnea e cellulis sinuosis compositis, interius tenussimum, albumen carnosum continens. Embryo minutus. Radicula conica hinc hili latus versus spectans. Cotyledones minima distantes, incumbenites ?

Hab. Assam, *Suddyah* : in campis graminosis, 2*nd January*, 1836.

SOLANACEÆ.

Solanum.

Solanum trilobatum, Pl. CCCCXIV. Fig. 2.

Longe scandens, ramis teretibus, aculeis sæpius solitariis robustis sparsis retrorsum uncinatis. Petiolis limbum subæquant. 1, 2, 3 aculeatis, foliis carnosis senioribus deltoideo-ovatis profundis 5-lobis, cæterum integerrimis glaberrimis, vena primaria utrinque aculeos 2-3 gerente, secondariis vel 1-aculeatis vel inermibus parce stellata pube, novellis exaxillis interdum oblongo-ovatis, integris, vel 3-lobis.

Racemis, (raro cymis) suboppositifoliis vel extra axillaribus, folium excedentibus vel subæquans, ebracteatis, plurifloribus. Pedicellis uncialibus, semi-nutantibus, post anthesin curvati-deflexis, clavatis fructuum valde clavatis, floribus amplis, initio fusco-viridescentibus, demum pulchre purpureis.

Alabastris oblongis viridibus, calycis parce pubegere sepala sublanceolata in alabastro dense pubegere. Corolla rotata, cito reflexa dorso, pubescens, marginibus exceptis, venis reticulata, quarum primaria basi utrinque viridescens. Filam. breviuscula. Anth. luteæ, apicem biporosa. Stylus filiformis subdeclinatus vel rectus ad apicem tantum supra curvatus.

Pollen lanceolato-ovatum glabrum 3 sulcatum.

Stigma subcapitata, ovarium oblongum glabrum utrinque sulcatum bilocular. septo tenue, æstivatio valvatim inflexa. Ovula 00. foramine ad hili latus, tegminum distinctio nulla, (certainly one integument, at an early stage,) nempe unico citius nucleo omnino confluent.

Baccis immaturis globosis pisi magnitudine viridibus apice albis, pedicellis armatis vel inermibus, stylo processus lapso,

obsolete bilobis, septis obliteratis potius indistinct ob pulpam in que semen nidulant.

Sem. reniform. vertical. ! albidum.

Hab. Bengal. In Sunderbunds.

Lycium.

1. *Lycium armatum*, Gr. It. Notes p. 161. No. 827.

Hab. Bootan.

2. *Lycium canescens*, Gr. It. Notes p. 214. No. 83.

Hab. Affganisthan.

Hyoscyamus.

Hyoscyamus squarrosus, Gr., Pl. CCCCXIII. Itin. Notes p. 244, No. 372.

1. Plant natural size, frequently much larger with much more tomentum and all the leaves curved.
2. Bud.
3. Flower.
4. Genitalia, tube of corolla hidden by the calyx.
5. Corolla laid open.
6. Anther (back)
7. Ditto Front.
8. Pollen 8*a* immersed.
9. Anther after dehiscence.
10. Pistillum.
11. Apex of syle with stigma.
12. Long section of ovarium
13. Transverse ditto.
14. Ovulum, usual *concrete* structure.
15. Partum situs.
16 Fruit.
17. Same, half calyx removed. } from last year's specimens.
18. Seed.

2. *Hyoscyamus angulatus*, Gr. Pl. CCCCXII. It. Notes p. 325. No. 2*a*.

Hab. Affganistan Chagur Serai.

Scleromphalos. Nov. genus.

Scleromphali sp., Pl. CCCCXIV. Fig. 1.

Hab. *Bootan Panukha* : *April* 2*d*, 1838.

Physalis.

Physalis angulata.

Caulibus hirsuta erecta ramosa, ad articulis tumidis, juniorib. sulcatis, foliis petiolatis cordato-ovatis acutis, grosse dentatis, floribus axillaribus solitariis cernuis, parvis, ochroleucis.

Cal. tuto cylindrico 5-partito. Cor. infundibulif. tubo calycis laciniis longitud. plicato limbo 5-dentato, dentibus subcucullatis sinubus inflexis, dentiformib. Stam. 5 ad basin tubi insert. inclusa. Filam. filif. anth. bilocule longit. dehiscent.

Stylus apicem versus paulo incrass. Stigma capitata. Ovarium bilocule, loculis 00. ovulatis, placentis carnosis crassis.

Pericarp. calyce ampliat. inflata connivent. 5-angulata inclusa breviter stipitat. baccatum polyspermum. Sem. pulpa nidulantia complanata albumen carnosum. Embryo curvatus centralis radicula tereta elongata hilum spectant. Plumula inconspicua, fructibus pendulis.

Hab. In horto meo Mergue : *Sept.* 1834.

SCROPHULARINEÆ.

Pterostigma.

Pterostigma stricta Gr. Pl. CCCCXVII. Fig. III.

Herba stricta pedalis, ramosa simplexve strigosa, odore aromatico fortis, fol. brevissime petiolata, ovata obtuse crenata; capituli florum axillares terminalesve basi foliosi, et quasi involucrati, dense pilosi, floribus cæruleo violaceis.

Cal. basi bibracteolatus, bracteolis linearibus 5-partitus, lacinia postica majore, glandulis depressis luteis pilisque longis strigosis articulatis insignitus.

Cor. bilabiata, labiis profunde fissis, superiore ascendente rotundato emarginato, æstivatione extimo inferior 3-lobo, lobis rotundatis basi pilosiusculis, inter medio æstivatione intimo.

Stam. 4 didynama inclusa, filamenta basi pilosa. Connectivo glandulosum gibbosum. Anth. paris superioris brevioris biloculares, loculis transversis obliquis inæqualibus infimo duplo minore, paris inferioris 1-loculares, loculo supremo, minimo rudimentaris glanduloso. Pollen album læve hinc sulcatum.

Glandula hypogyna crassa, postice incompleta ad basin varii bilocularis. Placentæ substipilatæ subhæmisphæricæ. Ovula 00, tegumentis indistinctis, foramen inconspicuo hilum prope. Stylus inclusus curvatus spicem versus obliquis et valde dilatatus in stigma transversum.

Capsula. ?

Obformam antherarum et connectivum etiam stigmatis certe Limnophilæ sp. 1, 2, propinquum.

Limnophylla.

1. *Limnophylla hetrophylla,* Pl. CCCCXVI. Fig. 2. vix.

Columnea hetrophylla Roxb. Fl. Ind.

Erecta, glandulosa, fol. pluribus? verticillatis subseniis cuneatis pinnatifidis, sessilibus, floribus oppositis subsessilibus potius breviter pedicellatis violaceis, nudis. Calycibus subangulatis, glandulosis. Corolla bilabiata ringente, labio superiore æstivatione extimo emarginato violaceo, inferiore 3-lobo azureo, lobo medio æstivation intimo.

Antheris discretis loculis discretis transversis, glandula hypogyna 0. Stigmata generis.

Pedunculis fructiferis paulla elongatis deflexis. Capsulis subglobosis calyce subinclusis bivalvibus bilocularis, septis

liberis ex marginibus valvularum inflexis solutis. Placenta centrali libera. Semina 00 minuta nitidissim. atra oblonga parum angulata, obsoleti punctulata, potius levissima rugulosa.

Situation of parts, see Pl. CCCCLVIII. Fig. II.

a. Light blue.
b. Brown.
c. Light green.
d. Light green with the under side rather paler.
e, *f*, *g*. Purplish.
h. Tingy green.

HAB. Bengal. In limosis, secus ripas fluminis Booree Barak.

2. ***Limnophylla Cana.***

Cal. ad medium subbilabiatim 5-partitus. 5-angulatus subæqualis nudis. Cor. infundibuliformis subbilabiata, tubo compressiusculo, labio superiore emarginato. Stam. 4 didynam. Antheræ didymæ demum transverse. Stylus apice obliquis 3-gonus. Stigma transversa transversque sulcata. Capsula bilocularis bivalvis, valvis bipartitis. Placentæ centrali liberæ adnato.

Herba natans, vel semi-immersa, contuse graveolens: fol. 3 verticillata, immerse pinnatifida, emerse lanceolata sessilia, serrata 5-nervia, flores sessiles solitariisque in axillis folior. ebracteati, dilutissime cærulei, tubo antice brunneo striato Semina suboblongo-ovata, lævia.

HAB. Bengal prope *Jumalpore* in aquis stagnantib: *September 22nd*, 1835.

OBS. Hujus generis est Limnophylla? cum bracteolæ 2 minutissima dentiformes, sepalis 2 laterales, vix alternantes, antheræ perparia cohærentes, capsula (immature) calyce tubo inclusa, bilocularis, eodem modo (tanquam abanatomia judicare licet) dehiscens.

Etiam Columnea heterophylla Roxb. Limnophyllæ sp. Benth. vix. Limnophyllæ Br. descripat. bracteis ad maximum evolutis, linearibus demum patentibus. Capsula apicem versus tan-

tum dehiscens, basin 2-locularis bivalvis, valvis bipartitis, dissepimentis exmarginibus valvularum inflexis, apices versus tantum solubilibus. Placentæ, apex conicus libera. Seminibus angulatis, atris minutissime punctulatis, an ideo generis diversa.

3. *Limnophyllæ* sp. Pl. CCCCXVI. Fig. 1.

Suffrutex prostrate sæpius rosaceo-patens. Caules virides-centes, pube grisea, folia griseo-viridia.

Flores campanulati, albi parvi 5-plicati.

Hab. Burma Circa Pagodas. Horbat. Kiown-wa.

4. *Limnophylla sessiliflora* Blume, Pl. CCCCXVIII. Fig. V.

Hab. Malacca.

Stemodia.

Stemodiæ sp. Pl. CCCCXXI.

Ramulis compressiusculis, foliis griseo-viridibus, præsertim subtus floribus luteis, labio superior pallido purpureo tinct. lobis lab. inferioris inferne eodem more coloratis, palato aureo.

Hab. Burma in Pagodis ubique, variat magnopere statura. *May* 8*th*, 1837.

Mimulus.

Mimulus assamicus. Gr.

Planta annua pusilla subglabra ramosa caulibus basin decumbens radicantibus, 4 gonis, faciebus latioribus alternantibus; fol. oppositis, breviter petiolatis ovata in petiolum attenuata, serrato-dentata, dentibus apicibus mammillosis; flores axillares solitarii oppositi, pedicellis filiformibus demum folia excedentibus nudis, superne planiusculis. Cal. prismaticus, 5-dentatus, 5-alatus, tubulosus. Cor. ringens, tubo calycem excedent. lab. superiore 2-inferiore, 3-lobo, lobis subæqualibus, crenulatis excepto medio lab. inferior. Cristæ 2 parum prominulæ apices versus pilis clavato-capitatis his-

pidæ, ad basin lobi medii lab. inferior desinentes. Color luteus, tubo intus rubro-guttato.

Stam. didynama inclusa, rud. 5-0. Filam. subulata simplici, connectivum cordatum carnosum dorso convexum. Anth. bilocul. loculis discretis didynamis, longitud. dehiscent. æqualibus, extus celluloso-papillosis præsertim basibus.

Pollen ovatum læve hinc sulcatum. Glandula hypogyna 0. basin album et anticum gibbum. Ovulum, biloculare, multi ovulat. Stylus filiformis, fasc. vasc. 2, stigma bilamellata, lamellis reflexis. Foramen hilum prope.

Capsula calyce aucto inclusa, lanceolata compressiuscula, stylo stigmatibusque brunneis terminal. bilocularis utrinque antica posticeque fissa longitudinaliter valvis septiscidentis placentisque persistentibus adnatis.

Placentæ stipulatæ, subsemi lunatæ.

Semina plurima minuta pallide brunnea ovata nec angulata, nec compressa, imatura aspectu mucilaginoso, extus lucida, celluloso-areolata. Raphe inconspicua nec clavata linearis, Chalaza punctiforme brunneum. Tegumenta 2 cohærentia inter se et cum albumine, exterius brunnescens celluloso areolat. interius membranaceum ! album.

Embryo minuta orthotropus in axi albuminis densi carnosi. Cotyledones rotundatæ, faciebus venis seminis oppositæ.

Hab. In arenosis *Burrumputur : March* 30*th*, 1836.

Mimulus Lin. Spr. sed vix Brunonis obcorollam ringentem nec personatam : Anne igitur Uvedalia sp. ab. utroque differ capsularum dehiscentia.

Obs. For a section of the seed and situation and alternation of the parts of the flower, see Pl. CCCCLVIII. Figs. 8, 9.

Anisanthera.

Anisanthera.

Herbacea pubescens, caule simplici stricto, foliis petiolatis, cordato-ovatis obtusis, serratis. Inflorescencia axillaris et

racemosa terminalis; floribus breviter pedicelatis, pallide ceruleis.

Cal. basi bractiolis 2-linearibus, profunde et æqualiter 5-partit.

Cor. bilabiata, tubo calyce paulum brevior, subinflato, fauce constricto, lab. superior emarginato, infer 3-dento.

Stam didynama, fauci inserta. Filam. filiform; anth. paris brevioris supereorisque bilocular, loculis discretis par longioris inferiorisve 1-loculares; connectivum glandulosum virid. Stylus clavat. Stigma breviter bilabiat.

Toris parum elevatus. Ovarium capsulaque calyce connivente ampliato cinctum biloculare, 00-ovulat. Placentis carnosis intra loculos productis.

Hab. Mergue in humidis, Mergue, specium unicum vid. Gen. distinctum. Occurrit etiam: Moaton. 210 *Aug*. 1834.

Microcarpæa.

Microcarpœa diandra, Pl. CCCCXVII. Fig. II.

Cal. campanulatus, 5-partitus, subæqualis. Cor. campanulata, tubo inflato, fauce subconstricta, limbus 5-fidus, lacinia antica quinta elongata. porrecta. Stam. 2, posticis minoribus. Antheræ leviter cohærentes, 1-loculares ovatæ, Ovarium 2-loculare. Placenta centralis. Stigma obliquum indivisum apathulat. papillosum.

Herba minima muscosa. Fol. opposita sessilia linearispathulata obtusa carnosa. Flores minuti in axillis folior. sessilis et solitaria.

Calycis segmenta ciliata, 2 antica paulo majora. Cor bilabiata subcampanulata, lab. super minimo bifido, inferiore 3-lobo, lobis obtusis, plus minus ciliatis. Anth. approximatæ. Ovar. septa e marginibus valvarum introflexis. Cupula cellulosa subdenticulata ovaria basin cingent.

Hab. Bengal at *Jumalpore* et alabi, in humides, *Sept*. 24*th*, 1835.

Limocella.

Limocella diandra Roxb.?

Situation and alternation of parts Pl. CCCCLVIII. Fig. 12.
a. Sepala.
b, b. Lab. superius.
c, c, c. Do. inferius.
d, d. Stamina.
e. Cupula ovaria basi cingens.
f, Ovarium.

Dopatrium.

Dopatrium junceum, Pl. CCCCXVIII. Fig. VI.

Semina oblonga obsolete nunc angulato, lævissima lucida fucescentia.

Testa alba tenuissima e cellulis minimis conflata, raphe nulla, macula saturatione apicali notata.

Tegument, interius quam maxime tenuissimam, fuscum e cellulis conflatum, (nucleare) apice celluloso, (nuclei apex nempe immulatus) crasso strophiolum formanti.

Albumen apice truncatum densum.

Radicula orthotropa alba; cotyledones minimæ plano-convexiusculæ.

Suddiyah: Sept. 2d, 1835.

Herpestes.

1. *Herpestes.*

Herbacea, pubescens, caulibus repentibus radicant. teretib. fol. oppositis petiolatis lanceolatis, subintegris, obtusis, floribus spicatis terminalibus, tubo albo, limbo rubro purpureo, saturatius faucem versus.

Bracteæ 3 spathulatæ ad basin cujusque floris, quarum laterati multo minores.

Cal. irregular, 5-partitis, sepalis lineari-subulatis, infimo bracteæ majori oppositi majore, 2 superior inter-media, 2 lateralia minima.

Cor. infundibulif. tubo calyce longiore, paulo infra medium constricto, limbo 5-fido laciniæ 2 superior paulo majorib.

Stam. 4, didynama filament. parte constricta tubo inserta, filiformia, connectiveque pilosa. Anth. biloculi didymæ, longit. dehiscent. Rud. 5.

Stylus stam paulo longior. Stigma bilab. lab. infer longiore. Ovar biloculi placentis axilib. pluri-ovulatum ovulis transversis.

Hab. Mergue. *Mergue Herb.* 183.

2. *Herpestes.*

Caulibus repentib. radicant. pilosis, foliis sesselib. linearilanceolatis obtusis, serratis utrinque punctatis, subtus ad nervos pilosis, floribus solitariis axillaribus, pedicellis brevibus, ad basin florum bibracteatis.

Cal. basi bibracteat 5-partit. Sepalis 2 superior paulo majorib.

Cor. subinfundib. tubo substricto calycis longitudinem, limbo 4-lobo, lobo inferior major. emarginato. Stam 4, didymæ. Filam. simplicei medio tubo inserta. Antb. bilocul. loculis transversis, (faux pilosa). Stylus filiformis stigmaque bilabiat ? inclusis. Ovarium cupula glandulosa insidens biloculare, loculis 00 ovulatis, placentis carnosis intus productis.

Cor. tubo basi lutescenti, apicem limboque purpureo.

Hab. In aquosis, Kyouktay : 193. *Augt.* 1834.

Obs. Omnia Gratiolæ sed stam 4. The stamen deficient, would be opposite to the emargination of the lower lip : or rather lateral, the resupination not being complete.

3. *Herpestes.*

Herba pubescens, decumbens, caulibus ramosis basin versus fol. reliquus tectis, fol. lineari-lanceolatisis sessilia serratis foveloso-punctatis, floribus solitariis in axillis folior. superior, breviter pedecellatis conspicuis, tubo basin versus lutescent

carneo lineis rubris, limbo porpureus lineis rubris, lobo emaginato lateralique basin versus alba, et intus pilosa.

Cal. bibracteolatus. Omnia Herpestis, Cor. infundibulif. subbilata, lab. super 3-lobo, lobis æqualib. infer majore emarginato.

Odor menthaceus fortis.

Hab. In aquosis graminosis, Kulweny: 216 *Augt.* 1834.

4. *Herpestes pulcherima.*

Decumbens, radicansque, pubescens, fol. sessilib. lineari-lanceolat. medium supra serrulatis subobtusis, fovuloso-punctatis. Racemis terminalibus foliosis. Pedicellis solitariis axillarib. foliis brevioribus, calycibus bibracteolatis, bracteolis setaceis. Corollis majusculis, tubo albido calycem fere duplo excedent, hinc postice? brunneo striato, lobis 4 purpureo-rubris, lobo majore, emarginato, basin versus alba.

Hab. In aquosis. Mergue: no. 837. *Decr.* 1834. sp. pulchra.

5. *Herpestes pygmea.*

Minima 2-3 uncialis, fol. lanceolatis serratulis favuloso-punctatis, floribus axillaribus solitariis subsessilibus caneus vel pallide purpurascent. basi 2 bracteolatis sepalis sub æqualibus longitudeus tubo corollæ.

Hab. Mergue in arenosis graminosisque nuper inundatis contuso odoreum aromaticum effundit. No. 666. *Nov.* 1834.

6. *Herpestes.*

Caulibus prostratis, teretibus, foliis sessilibus spathulatis obtusissimis, subintegris, punctatis; floribus axillaribus solitariis magnis, pallide lilacinis, pedicellis, foliis duplo longioribus.

Cal. basi bracteolis 2-linearib. 5-sepalis, sepalis valde inæqualib., 2 exterior maximis ovatis, 2 interior minimis linearib. 5 *intermedio* lanceolato.

Cor. campanulata 5-partita, laciniis suberectis emarginatis. Stam. 4 didynama. Anth. cinereæ. Stylus filiformis. Stigma capitata viridia. Sp. distinctissima.

Hab. In limosis paludibusque circa Mergue: *no.* 284. *Sept.* 1834.

Cardiolophus.

Cardiolophus decussata, Pl. CCCCXVII. Fig. 1.

Herba erecta, vel decumbens contusa sub aromatica graveolens, ramosa, 6-uncialis, caules 4 goni, fol. linearia denticulata decussata, flores axillares solitarii sessilis basi bibracteolata, albo limbo purpurascente.

Cal. 5 sepalus, quam maxime inæqualis, sepalo postico cordato; "2 lateralibus minimis obtectis."

Cor. tubulosa, infundibuliforme, limbo 5 fido subæquali.

Stam. 4 vix didynama inclusa, antheræ didymæ.

Ovarium 1-loculare placentis 2 crassis carnosis parietalibus stipitatis, stylus brevis stigma capitatum subilob.

Capsula (immatura) membranacea, bivalvis (valvis 2-partitis?) subglobosa, valvis medo septiferis, placentis adnatis, hæmisphæricis.

Semina 00. minuta oblonga angulata.

Obs. The largest sepal is invariably posticous, but there does not appear to be any fixed site for the demidiate, lateral one.

The situation of the placenta differs from that of most (all?) Scrophularineæ, but it is merely a difference of degree and evidently dependent upon the non junction of the placentæ along with the mesian line.

Hab. Bengal near Jubbulpore, *Sept.* 1835.

Bonnaya.

Obs. Cal. subæqualia 5-partit. laciniis linearibus. Cor. ringens, labio superiore emarginato, inferiore 3-lobo, intus bi-cristato (cristis medium versus liberis). Stam. 2, Stigma bilabiat. Glandula hypogyna concava inter corollam ovariumque, lab. inferiore opposita. Capsula cylindrica, vel subulata, biloculare. Semina 00. reticulata linea longitudinali 1 sulcata.

The two crests, from their situation, represent two abortive stamina, as they are placed one on either side of the middle lobe of the lower lip, (which is the situation of the lower pair in all didynamous species of this order) the 5th generally wanting, would alternate with the segments of the upper lip.

1. *Bonnayæ* sp.

Caulibus simplicibus ramosisve quadrangularibus, foliis oppositis elliptico linearibus, basibus subamplexicaulibus acutis, acutissime serratis.

Floribus racemosis albis, lab. inferiore maculis rosaceis.

Cal. 5-partibus, sepalis subulatis $\frac{2}{3}$ æqualib.

Cor. $\frac{2}{3}$ bilabiata ringens, tubo deorsum curvato labio super oblongo emarginato, inferior 3-lobo, lobo medio cordato, intus bicristato, cristis medium versus liberis factis, apicibus obtusis incurvatis, (rudim. stam?)

Stam 2 intra sinus labiorum inserta inclusa, filam. brevia. Anth. bilocul. loculo superior transverso, infero perpendicularia.

Stylus inclusus, filifor. Stigma bilabiat. Glandula hypogyna concava, subdentata, sepalo inferiore opposita, intra corollam ovariumque sita.

Ovarium bilocul. loculis pluri-ovulat. Pericarp. filiforme seorsum curvat. bilocular polysperma. Semina ascendent.

Hab. Mergue. In nearly cleared ground. Ins. Madamacopiosa. *No.* 44. *Aug.* 1834.

2. *Bonnaya bracteata*, Pl. CCCCXVIII. Fig. III.

1. Seed opaque dry.
2. Immersed (transparent.)
3. Do. Long section.
4. Portion of testa from an unripe seed.

Suddyah: *Aug.* 1836.

3. *Bonnaya cyanea*. Gr.

Caulibus prostratis, sub 4-gonis, in limo radicantibus, foliis linearibus, vel lineari-spathulatis sessilibus, pauci dentatis, obtusis, floribus racemosis majusculis, cyaneis, racemis multifloris terminalibus.

Cal. 5-partibus sepalis æqualib. obtusis.

Cor. ringens, tubo calyce duplo longiore cylindrico, lab. superior subfornicato emarginato, inf. 3-lobo, lobis lateralibus reflexis, medio cordato majore, patente basi processus curvatis 2 luteis gerente.

Stam. 2 inclusa. Anth. didymæ, perparia cohærentis, cœruleæ. Stylus filiformis. Stigma bilabiat. cæruleum. Glandula hypogyna, labio infer opposit. inter corollam ovariumque. Ovarium biloculare, placentis ovuliferis, incrassatis. Capsula rotata stylo apiculato, basi calyce amplexa, bilocul. Sem. 00. minute bivalvis. Placenta libera facta verrucosa.

Hab. In aquosis limosisque Mergui : *no.* 282. *Sept.* 1834.

4. *Bonnaya pusilla* Gr.

Caulibus prostratis basin versus radicantib. ramosis 4-gonis, fol. linearibus obtusis sessilibus 4, 5 dentatis. Racemis terminalibus paucifloris, floribus, inconspicuis pallide cæruleis. Antheris albidis, processum apicibus albidis, sepalis tubum corollæ fere æquantib. Corolla labio superior oblongo, ascendento glandula hypogyna, 3-dentato, ovarium subæquant.

Hab. In limosis, Mergue : *no.* 283. *Sept.* 1834.

Præcedente affinis, statura 3-plo minora.

5. *Bonnaya serrata.*

Cal. profunde 5-partitus. Cor. ringens vel personata, tubo angusto deorsum curvato, lab. superiore emarginato, marginibus revolutis, fornicato, infer. 3-lobo, porrecto, basi bi-cristato. Stam. 2 inclusa, antheræ biloculares, loculis obliquis divaricatis. Stigma bilamellatum. Glandula hypogyna cuneato obovata. Capsula siliquiformis cylindracea subulata, semiexserta, bilocularis bivalvis. Septo parallelo, placentæ lineari solubili adnati. Semina ovata subangulata, livida, muricata, muricis exoreolam orientibus albis (omnino ut in Torenia calcarata, p. 124.)

Herba repens radicans, caulis 4-gona, fol. oblonga sessilia argute serrata. Racemi terminalis, flores oppositi basi bracteato, pedicello bractea breviore albi, lab. infer. rubro guttat.

Obs. *Gratiola serrata*, Roxb. Fl. Ind. Vol. I. p. 140. Torenia calcarata proximum, discrepans staminum numero corollæque cristata glandulaque tantum. An Lindernia Br. cui staminum numero excepto omnino accedit. Confer Browns Prod. 1—441 (296) sub Linderniam. Partium situs omnino uti Torenia calcarata. Crista est staminum par inferum abortivum.

Huic generi pertinet Gratiola grandiflora Lin. Roxb. Fl. Indica Vol. I. p. 137.

Decumbens basi radicans. Caules 4-goni, fol. lanceolata, sessilia serrata obtusiuscul. Racemi terminales. Calycis segmenta subpatentia. Cor. personata, fauce inflata, cristæ processus lutei clavati. Flores, pallide azurei.

Hab. *Jumalpore: Sept. 24th,* 1835.

Obsitum glandulæ hypogynæ, pro rudimento staminis potici quinte vix consideranda est?

6. *Bonnaya.*

Caulibus repentibus radicantibus stoloniferis; foliis obovatis in petiolum attenuatis obtusis, serratis glabris.

Racemis terminalibus, paucifloris, floribus cæruleis pedicellis oppositis basi bracteatis.

Cal. basin usque 5-partit. sepalis æqualibus lineari-subulatis.

Cor. ringens tubo calyce breviore, lab. super integro, infer 3-lobo. Stam. 2, labiis alternantia ideoque par superum inclusis. Filam. planis brevibus. Anth. cæruleæ, loculis divaricate perparia approximatis. Labio inferior bicristato, cristis luteis medium versus liberis, apicibus subuncinatis rudiment staminum gerent. Stylus filiform. stigma bilab. lab. inferior duplo majore ambobus laciniatis. Gland. hypogyna inter coroll. et ovar. postice. Ovar. 2 loculi.

Capsula cylindrica subulata, 2-loculi. Placentis incrassatis. Semin. 00, ovatis apiculatis, testa cellulosa areolata cellulis transversis, linea l ab hilo usque ad apicem currento cellulis longitudinal. Pl. CCCCLVIII. Fig. 5.

Hab. Mergue. In humidis, cleared ground Begtown, *Platoor*: *no.* 103. *July, Aug.* 1834.

Bonnayæ sp. Genus quoad Spreng. System.
No. 1, p. 106 (44) ejusdem generis, semina ad huc non vidi.

Treisteria. Gen. nov.

1. *Treisteria cordata* Gr.

Herbacea, decumbens, radicans, pubescens; caulibus 4-gonis. Foliis oppositis inæqualibus cordato-ovatis petiolis attenuatis, serratis.

Racemis axillaribus paucifloris abbreviatis, fol. breviorib. bractea setacea ad basin cujusque pedicelli; floribus inconspicuis, lab. super. brunneo-purpurascente, infer. albidum marginibus purpureis, lobo medio basin versus pilosa macula lutea, like a bat flying.

Cal. persistens, gamo-sepalus, 3-alatus 3-dentato sepalo antico 2-dentato e 2 coalitis formato ?

Cor. bilabiat. tubo calycem excedenti, fauce subampliato,

lab. superior integro · ciliato, ascendente, deflexo, 3-lobo, lobo medio majore.

Stam. didynama fauci inserta, filam. pars infer. arcuata ascendentia ad exsertionem processum rectum nec ascendens filiform. pallide purpur. apice glanduloso luteo gerente.

Anth. loculi divaricat. apicibus barbatuli paris longioris cohærentis.

Stylus filiformis. Stigma inclusa bilabiat. Glandula hypogyna hinc fissa (postice ?) ovarii basi cingens. Ovar. calyce connivent. subinflato-inclusum, 2-locul. placentis carnosis intra loculos productis, ovulis 00, curvatis, foramen hilum prope.

Capsula membranacea 2-locula, 2-valvis, dissepimentis placentis axique liberis factis. Sem. angulata plurima abortientia areolata compressione, Fig. 4. Pl. CCCCLVIII. ovule at a very early period. The same post impregnat. and Capsulæ parietes e cellulis transversis angustis creberrimis format.

Hab. Mergue. In humidis ripis. Ins. *Kully Gewen* ; *no.* 561. *Oct.* 1834.

Obs. Apparently 3 sepals, but in reality 4, the posticous one wanting and the anticous formed of 2, as indicated by its 2-dentate apex. It has a central vascular fascicle, but which is very small in comparison with the two lateral ones, nor does it, like these last, send off any branches. The nerves of the lateral sepals are large, the lobe has likewise a central vascular fascicle which does anastomose with the two lateral ones, but only at the apex, the ciliæ of the upper lip are sometimes simple, at least before expansion. In all I have examined after impregnation, these hairs are beautifully and most minutely reticulated, the cells forming the reticulations running longitudinally.

Pentsteriæ valde affinis.

2. *Treisteria lanceolata* Gr.

Basi suffruticosa ; caulibus pubescenti-hirsutis, teretib. ; fol. petiolatis, lanceolatis, subrepando-crenatis, subacutis, subtus albidis, sublente cellulosis et ad nervos pubescent.

Racemo terminate, simplice nutante glanduloso piloso ; floribus breve pedicellatis, pedicellis glanduloso-pilosis, bractea lineari-setacea glanduloso-pilosis paulo brevior, ex purpureo albi, 1 uncialis faciei Herpestis; flores ante anthesin ascendent.

Pedecilli subflore bibractiolati, bracteolis angustiss.

Cal 5-phyllus, sepalis angustissimis, postico saltem per æstivat. longiore, florem super æqans, intermedium breviore, 2 antica florem paulo brevior omnibus glandulo pilosis.

Cor. infundibulif. tubo medio infra ampliato ; limbo 5-lobo subbilabiat. lobis 2 posticis albis.

Stam. 4, didyma, ad apicem partes tubo angustato inserto, inclusa glanduloso piloso filiform. Anth. bilocul. loculis parallelis, divaricatis parce glanduloso-pilosis, apices versus dehiscent. Pollen oblongum læve.

Stylus filiform. Corolla tubum subæquans. Stigma bifidum. Cupula hypogyna breviss. ovarium basin cingens. Ovar. basin solidum, 2-loculare, 00-ovulat. Ovulis transversis, placentis linear affixis, 2 seriatis, foramen hilum prope. Pl. CCCCLVIII. Fig. 6.

Æstivat. imbricato, lab. 2 postices extimis.

Hab. Mergue. In sylvis densis, Ins. Medamam Pator. No. 65. *Dec.* 1834.

Hujus generis est Treisteria Kully Gyoon.

Hab. Burma *Isabagya : May* 10, 1837.

3. *Treisteria assamica* Gr. Pl. CCCCXX.

Herbacea laxa basi decumbens, pedalis bipedalisve, subglabra,

Caulis tetragonus puberulus, articulis valde incrassatis, sanguineo-purpureis.

Folia opposita longiuscula petiolata subattenuata, obtusa, irregulariter crenato-dentata, supra læte viridia, sublente punctulata tactu retrorsum scabra subtus pallida, utrinque sed præsertim infra ad venas puberula, basi sæpius obliqua, venæ secondariæ distinctæ. Petioli unciales supra plano-canaliculati medium infra purpurascentes.

Racemi ad authesin folia vix æquantia, demum elongato excedentia vero terminalis, quamvis sæpe axillares videntur, tetragoni scabrelli angulis acutis marginalis.

Bracteæ foliaceæ lanceolato-lineares, pedicellis 3-plo breviores.

Pedicelli subopposititi, ancipites sursum latiories marginati fere alato.

Calyx 4 sepalus, sepalo postico maximo foliaceo, ovato cordato subintegro, venoso, venis apicibus arcuata nexis, auriculis baseos deorsum productis, sepalo antico foliaceo, ovato, basi subcordato, apice bifido vel emarginato, venoso; venis magis reticulatis, centrali fasciculi vasorum sinu respondenti, 2 lateralia minima linearia carinata, intima, scabrella.

Corolla personata, calyce paullo longior labio superiore minimo fornicato apice erecto emarginato, fusco vel rubro-fusco, inferiore 3-lobo, albo, lobis rotundatis (intermedio minimo) marginibus inflexis, bicristato, cristis pubescentibus flavis cum lobo medio utrinque alternantibus desinentibus in corpore clavato, cujus caput valde incrassatum glandulosum. Tubus intus villosiusculus.

Stamina 2 (superiora) inclusa. Filamenta breviuscula glabra. Anth. approximatæ loculis ad anthesin valde divaricatis, vix contiguis, longitudinaliter dehiscentibus, albis, connectivum dilatata, subloculum superiorem 1-dentatum. Pollen album, ovatum sulcatum, sublente $\frac{1}{2}\frac{1}{0}$ immersum, obscure granulosum. Glandula hypogyna magna carnosa, sublobata postice incompleta.

Ovarium conico-ovatum glabrum, biloculare; ovula 00. ascendentia galeæformia, foramen hilum prope, facieis raphalis demissior. tegumento nullo distincto.

Stylus filiformi-clavatus lævis, bivasculosus; stigma bilamellata, lamellis approximatis rotundatis, fimbriato-denticulatis, postico vel superiore minora.

Capsulata late ovata, compressa stigmatique sphacelatis stylo apiculata, marginibus undulatis, basi glandula cincta, calyce ampliato magisque foliaceo clauso obtecta *parietibus venosis* bilocularis, valvis submembranaceis concavis, marginibus simplicibus flexuosis subinflexis. Placenta libera, septis apice distinctis adnata, valvis parallela.

Semina 00 minuta, rotundata, quadrata, apice utroque depressiusculo, pallide brunnea foveolis 6-7 lateralibus profundis exsculptis areolata reticulata, papillis albis lineata dispositis scabrella: funiculo brevi atrato. Raphe inconspicua linearis, angustissima; chalaza punctum apicule atratum submammillaforme.

Tegumentum coriaceum, albumini denso carnoso firme adhærens.

Embryo in axi albuminis orthotropus. Cotyledones minimæ plano convexiusculæ cum raphe alternantes? Plumula inconspicua. Radicula longa, deorsum incrassata.

Obs. *Treisteria*. Genus distinctissimum. Bonnayæ affinis corollæ Herpestidi quo habitu Toreniæ, abomnibus distinctus ob coalitionem sepalorum 2 anticorum. Species altera e Mergue habeo.

Gen. Char. Calyx 4 sepalo, sepalo postico maximo, interioribus minoribus obtectis.

Cor. personata, labio inferiore bicristato. Stam. fertilia 2.

Capsula *calycè ampliato cincta*, bilocularis, bivalvis, valvis integris margine simplicibus. Dissepimento parallelo placentifero, demum libero.

Semina foveolis (6-7) insculpta.

Herbæ decumbentes.

1. Flower of *Treisteria assamica* Gr. viewed anticously.
2. Do. laterally.
3. Do. posticously.

4. Corolla viewed laterally.
5. Do. laid open, between the labia.
6. Anther back view.
7. Do. Inner view.
8. Do. lateral.
9. Pollen.
10. Do. immersed in water. The clefts are too distinct.
11. Pistillum with the two lateral sepals.
11*a*. Do. Posterior sepal ½ removed anticous one deflexed.
12. Long section of ovarium, from right to left.
13. Do. transverse section.
14. Stigma.
15. Ovulum.
16. Fruit natural size.
17. Do. sepals removed.
18. Placenta and adnate septa, one valve removed.
19. Seed viewed on the raphal face.
20. Do. lateral.
21. Do. long section parallel to the raphe.
22. Vertical view of base of seed.
23. Transverse section of seed through the middle.
24. Embryo.
25. Capsule ripe before dehiscence.

Suddyah Upper Assam: Aug. 22*d*, 1836.

Remarks. Torenia Asiaticæ proxima est Torenia mollis edentata molliter hirsuta, magis erecta. Calycibus hirtis. Corollam calyce paullo interdum fere duplo longiore, pallidissime cærulea, lobis lateralibus partem saturatissime azureis, lobo medio labiis inferioris macula lutea. Filamenta longiora basin edentuta!

Ovarium apice obliquum. Glanduli cyathiformes. Stigma par brevius staminam tantum æquans.

Flores terminales, (pseudo axillares) fasciculati, vel interdum racemosi. Corollæ limbus interdum cæruleis.

Torenia edentula; erectiuscula molliter hirsuta: foliis petiolatis cordato-ovatis, rugosulis, floribus terminalibus fasci-

culatis racemosisque corolla calycem vix duplo excedente, filamentis longioribus basin edentulis !

Proxim. T. asiaticæ, a quo distincta mollit. filamentisque omnibus simplicibus huic charactere a genere toto recedit.

In his omnibus testa foveolis exsculpta est, foveolis paucissimis in novo meo genere, plurimis in Bonnaya bracteata.

Testa (tegument) quam maxime coriaceum, albuminum firme adhærent. Tecta est pellicula vel cuticula tenuissima membranacea e cellulosa, quæ in seminibus siccis contrahitur in fundum alveolor. et his aspectus cellulosus sat, in hanc factis amplificatur et bullum format. foveolum quemque in super; ex hoc oritur aspectus papillosus seminum humefactorum. Hanc structuram observavim in Vandellia, Torenia, Bonnaya et in novo genere.

Pellicula testa est, *testa* Vandellia scabra Bonnaya brachiata in quibus et presertim priore reticulata est cellulosa et laxa, in utrisque.

Raphe e cellulis elongatiusculis formata præcursa est. In Bonnaya brachiata membranacea est, et hispidula pilis apice cruciatim fissis.

Mr. Benthan says, while refering to the distinctive marks between Scrophularineæ and Primulaceæ, in allusion to the stamina of these two orders belonging to different series, that no trace of the inner series has as yet been observed in Scrophularineæ, except *perhaps in Bamia*. Without having any knowledge of Bamia, there can be no doubt that its disk is analogous to that of Scrophularineæ ; and this again, although often incomplete, obviously represents either the *whole or portion of the* inner series of stamens.

Tittmannia.

1. *Tittmannia sp.*

Planta minima pilosa, caulib. ramosis 4-gonis, fol. opposit subsessilis cordato-ovatis, obtusis, crenato-serratis, floribus

solitariis axillarib. pedicellis demum foliis longiorib. fructiferis deflexis.

Cal. subæqualiter 5-partibus.

Cor. ringens, tubo calycis longitudinis, lab. superior minimo, emarginato, livido, inf. maximo, 3-lobo, albo ad basin maculato-lutea.

Stam. 4-didynama. Filam. par. inferior longiores ad exsertionem dente obtuse, lab. superior utrinque exserta. Anth. perparia cohærentes biloculare loculis divaricate.

Stylus paulum longior, filiform. Stigma bilabiat. Ovar. biloculi. Placenta carnosis intra loculos producta.

Glandula hypogyna, intra corollam et ovarium labio inferior opposit. Capsula subglobosa bilocularis dissepiment tenuissimis.

Affinis, (Pentsteria sp. 3.) no. 45 quem vide.

Hab. In graminosis humidis, Kyouktay copiose etiam circa Mergue: *no.* 184. *Aug.* 1834.

2. *Tittmannia.*

Cal. æqualis profunde 5-partitus.

Cor. ringens, lab. superior emarginato subfornicato, infer 3-lobo deflexo basi obsolete 2-cristato.

Stam. 4 didynama. Filamenta apice dilatata paris inferioris ad exsertionem gibbosa extrorsum arcuata. Antheræ perparia cohærentes, didymæ.

Stigma bilamellata. Glandulo subannuliformis postice fissa.

Capsula globosa, calycis longitudine bilocularis bivalvis, septo parallelo libero placentifero. Semina angulata extus reticulatum, areolata.

Herba pusilla erecta, pilosiuscula, caule ramoso 4-gono, fol. cordata rotundata crenata, pedicelli nudi axillares, folia excedenti. Flores pulchri, lab. superiore fusco, inferiore cæruleo.

Ex charactere proxima Linderniæ Br. Pr. 1-441 (297)

anne congener. Columnea minuta Roxb. Fl. Ind. Vol. 3, p. 98.

Genus notandum *ob formam gibberemque*. Staminum longioram, seminumque testam areolatam.

Situation and alternation of parts Pl. CCCCLVIII. Fig. 13.

a. Sepala.
b. Lab. superius.
d. Inferius.
e. Stamina.
f. Glandula hypogyna.
g, *g*. Valvulæ capsulæ.
h. Placenta septifera.

3. *Tittmannia*.

Herba annua in locis humidis argillaceis proveniens pedalis vel spithamæa, teneri.

Caulis compressus, pubescens; fol. spathulato-obovata petiole attenuata, dentata flores racemosi cæruleo-albida parva, pedicelli pubescenti basi bracteati.

Calyx campanulatus, profundiuscale 5-partitus laciniis anguste lanceolatis. patulo recurvis.

Cor. ringens, tubo calycis tubum excedent. lab. superior subascendenti, emarginato, inferior 3-lobo, lobo medio minor, bicristato, cristis rotundatis elevatis, luteo-maculatis, pubescens.

Stam. didynama inclusa. Filamenta filiformia. Antheræ biloculares, loculis divaricatis. Pollen ovato-lanceolatum læve medio sulcatum.

Stylus filiformis, stamina superans, stigma bilamellatum. Ovaria læve, biloculare, ovula 00. Glandula hypogyna 0. placentis carnosis affixa calyce fructus ampliatus foliaceis, capsula inclusum, stylo apiculatum, membranacea bilocularis, dehiscentia loculicida ; septis huic adnatis. Placenta carnosa libera.

Semina 00. minuta angulata, albida, apice utroque punc-

tato, atro notata, testa reticulata, longit. Embryo orthotropus albuminis carnosa sed nec ampl.

Confer. characterem Columneæ tomentosæ : Roxb. Fl. Ind. vol. 3, p. 98.

Hab. Upper Assam Versus Nigrigam, in humidis: *Jan.* 19*th*, 1836.

Pentsteria. Gr.

Gen. Char. Cal. 5 carinatus bilabiatim 2 partit. lab. super. 3-dentato inferiore bifido. Cor. ringens, tubo deorsum curvato. lab. superiore emarginato, inf. 3-lobo. Stam. 4, didynama quorum par longius basin 1-dentatum. Antheræ perparia cohærentes (interdum inæqualibus, connectivum pillosum ? Stigma bilabiat. Capsula angulata calyce connivente tecta bilocul. polysperma, bivalvis placentis axique liberis factis. Sem. muricata, glandula hypogyna 0.

Herbæ sæpius pubescentes caulibus ramulisque 4-gonis calyx 5 carinatus. Toreniæ sp. Bentham.

1. *Pentsteira grandiflora* Gr.

Caulibus acute tetragonis, repentibus ; fol. cordato-ovatis acuminatis serratis, floribus sæpius terminalib. 2-3 conferta maximis formosis, tubo aterrime cæruleo, laciniis albis marginibus cyaneis.

Cal. bilab. lab. ambobus integris super e 3, infer e 2-sepalis.

Cor. infundib. tubo, calycem excedent. limbo 4-lobo, lobo postico superiore maximo *reniforme* vel emarginato, relique rotundata antico minore.

Stam. didynama, filam. atro-cyanea, par inferius paulo supra exsertionem dente subulata ejusdem coloris arcuatumque. Anth. loculis divaricatis, cyaneis : connectivum saturatius. Stylus filiformes eodem modo coloratus, stigma bilobiat.

pallidius. Cupula glandulif. ovarium cingens. Ovar. bilocul. Ovulis 00.

Hab. Mergue. In sylvis Bambusaceis. 523. Palar. *Oct.* 1834.

2. *Pentsteira paniculatis* Gr.

Caulibus 4-gonis prostratis radicant. foliis cordatis, petiolatis subobtusis, serratis, ciliatis subtus ad venas pilosis et favuloso-punctatis, floribus axillaribus vel in paniculam terminaliam pauciflorem dispositis, cæruleis, lobis labii inferior macula 1, alba, lobo medio ima basin saturatiss. violaceo. Dente stamen longior elongato, apice capitata. Anthera perparia cohærentis. Cal. 5-dentat. $\frac{2}{3}$ cupula glandulosa ovarii basin cingens.

Capsula 2-valvis, dissepimentis placentaque liberis factis. Sem. angulis obtusis verrucosa. Cor. tubo infra lutescens.

Hab. Vulgo in humidis, Mergue: 231. *Augt.* 1834.

3. *Pentsteira dichotoma* Gr.

Caulibus ramosis pubescens, dichotoma (ramis patentibus, 4-angularib. sub. 4-alatis; fol. oppositis, petiolatis, cordato-ovalis, obtusis, in petiolum decurrentibus, serratis serraturis serratulatis; floribus purpurascentibus in axillis folior. Dichotomis caulium sæpuis 3-4, confertis, subnutantibus.

Cal. 5-angulatus, 5-carinatus, carini supera majori-bilabiatem 5-dentato, lab. super 3, inferior 2 dentato carinis ciliatis.

Cor. ringens, tubo calyce breviore deorsum curvato, labio super emarginato infer 3-lobo, lobo medio paulum majore.

Stam. 4, didynama, quorum 2, inferior intra lobum medium lateralesque lobum inferior inserta, 2 super inter labiorum sinus. Filam pars inferior breviss. pars superior multo longiora, paulo supra basin 1 dentata, filiform. Anth. bilocul, loculis divaricata cohærentibus.

Stigma bilabiat. Stylus filiform. Ovarium calyce connivent inclusum biloculare, ovulis 00. placenta axili carnosa insertis. Glandula hypog. examinanda.

Hab. Mergue. No. 45. *Augt* 1834.

Genus affine, Tittmanniæ sp. 1. differt, (184) calyce e carinata, et staminum pare longiore ultra corollam arctiato.

4. ***Pentsteiræ racemosis*** Gr.

Herbacea erecta pubescens, ramis divaricatis inferior subdecumbentibus cum caulibus 4-gonis, 4-alatis ; foliis oppositis breviter petiolatis, ovatis, inferior in petioliam attenuatis, super basin cordatis, serratis cum mucronem, floribus axilaribus racemosisque luteis, racemis terminalibus, aliquando quaternatim subvertecillatis.

Cal. 5-carinatus bilabiatum 2-partit. lab. super. dentib. 3 breviss. inferior 2-fido, sepalis linearibus acutis.

Cor. calyce paulo longior tubo deorsum curvato, infundibuliform ringens, lab. super emarginato, infer. 3-fido. Par. longius stamin. ad insertionem 1-dentat.

Antheræ perparia cohærentus paris superior breviorisque duplo majores. Connectivum pilosum, Rud. 5-0.

Stylus filifor. Stigma bilabiatum.

Capsula membranacea calyce connivente obtecta, fusiformi-sub. 5-gona. 2-loculare loculo inferiore majore, dehiscentia valvaris. Placenta axisque libiræ factæ. Semina 00. muricata! Glandula hypogyna 0.

Hab. In arenosis humidis, Mergue, Bylou. 45. *Augt*. 1834.

Vandellia.

1. *Vandellia pedunculata*, Pl. CCCCXVIII. Fig. II.

Herba laxa decumbens, glabrata. Caules acute 4 goni soli subsessilia cordato ovata, obtusiuscula.

Pedicelli tetragoni ut Torenia, foliis longiores, axillares ante anthesin deflexis, ad anthesin et postea patentissimi

solitarii, oppositi; fructus valde elongatus uncialis vel 1½ uncialis clavatus.

Flores mediocres, cæruleo-purpurei. Sepala 5 æqualia, linearia, demum paullo ampliata.

Cor. bilabiata ringens, tubo calyce longiore lab. superiore plano porrecto; emarginato, lab. inferiore 3-lobo minuti crenulato, lobis lateralibus verticalibus: rotundatis, medio porrecto flavo basin macula lutescente.

Stam. didynama *inclusa* perparia arcte cohærentia. Filam. pavis superioris brevia, inferioris longa, extrorsum arcuata, basi paullo supra denticulo vel potius gibbere obtuso aucta.

Antherarum loculi contigui divaricatissimi. Connectivum loculorum stamina longiorum, et loculorum superiore paris brevioris mucronatum; paris brevioris loculorum inferiora in calcar productum. Pollen album, ovato, hinc sulcata glabrum. Glandula, hypogyna lutea postice incompleta, obsolete 3-crenatum et trisulcata, crenis lobis labii inferioris oppositis ideoque stamina sericei interioris parte. Stylus filiformis. Stigma par longius stamin non attingens bilamellat. lamellis patentibus intus papillosis.

Ovar. biloculare glabrum.

Ovula ordinis.

Capsula siliquosa, teretio subulata, sub semuncialis, calyce duplo excedens, bilocul. bivalvis, valvis integris margine planis, septis placentiferis, dein liberis, parallelis. Semina minutissima oblonga, albida foveolata; obsolete scabrella. Raphe linearis, inconspicue; chalaza punctiformis minima subclavata.

Hab. Upper Assam. In humidis *Suddyah*.

Distinct a Vandellia habitu, inflorescentia? labio corollæ superiore non fornicato, lobis lateralibus lab. inferioris verticalibus. Antherique loculis paris superioris calcaratis, an ideo segreganda.

Vandellia est corollæ Toreniæ anne non potius Toreniis ad jugenda.

1. Flower lateral view.
2. Corolla vertical view.
3. Do. upper staminiferous portion laid open between the labia.
4. Pollen.
5. Pistillum.
6. Capsule dehisced, valves incurved by dryness!
7. Seed opaque.
8. Do. immersed in water, viewed as a transparent object.

Suddyah : Aug. 1836.

2. *Vandellia scabra,* Pl. CCCCXVIII. Fig. IV. Benth. Scrophl. 36.

Annua, gracilis, basi decumbens, hirsuta. Caules tetragoni. Fol. subsessilis inferiore ovata, obtuse, superiore ovato cordata vel rotundata, obsolete serrata. Pedicelli fasciculati graciles folia duplo excedentes filiformes ante anthesin curvatuli, postea cito geniculata a basin deflexa. Flores certe terminales, quamvis ob axillam unam ramum caulem continuantem emittente axillares videntur.

Calyx hirsutis, 5-partitus. Cor. mediocris, tubo calyce longior intus villosiusculo labio superiorum fornicato, obsoleticmarginato irregulariter denticulato, venoso, fusco brunneo; lab. infer. æqualiter 3-lobum deflexo-patens cæruleum, ad bases paris longioris aureo-velutinum. Dentis paris inferioris rotundatæ sessiles, rugosulæ, filamenta demum an semper erecta et exserta.

Connectivum submuticum, dorso apices prope denticulo celluloso aucta, antheræ pollenque albumen. Glandula postice incomplete.

Stigmatis lamellæ conniventes, antheras paris longioris attingentes.

Capsula globosa, sepalorum parum mutatorum subæquans, glaber. bilocularis, dehiscente generis, bivalvis, valvis cymbiformibus margine simplicibus. Septis his parallelis, placentieris, demum liberis.

Semina oblongo rotundata, obtuse angulata, plumbea, extus sublente areolis albis conspicue reticulatis.

Raphe linearis, lævis, vix conspicua. Chalaza punctum apiculi atratum vix elevatum.

Hab. Upper Assam about *Suddyah*: *August*, 1836.

1. Seed opaque dry.
2. Do. opaque immersed in water.
3. Do. long section.
4. Transverse section.
5. Portion of cuticle shewing, that it is tranversed by the raphe, hence it is testa.

Suddyah: *Aug.* 1836.

Obs. In Vandelliis veris *lab. supertus corollæ certe fornicat., lobis labii inferioris deflexis.* Connectivum antheram loculorum obsolete mucronatum. Glandula eadem trisulcata eodem more opposita. Stigmatis lamellæ conniventes, paris supera antheras attingentes.

Connectivum etiam utrinque dente celluloso rugoso auctum.

Torenia.

1. *Torenia asiatica,* Pl. CCCCXVIII. Fig. 1. Benth. Scrophl. Indica p. 38.

Basi repens glabrate, vel parce breviterque pilosa, folia cordato-ovata in petiolum attenuata, venæ secondariæ distinctiusculæ, apici arcuati confluenti, et nexæ.

Calyx subglabratus. Cor. calyce vix $\frac{1}{3}$ longior saturati-azurea, per pulchre, lobis omnibus rotundatis, tubo intus atro cæruleo striato, antheræ muticæ vel breve mucronatæ connectivo simpliceo, dentibus paris longioris maximis, quasi *stipitalis*, atro purpureis.

Ovarium apicem versus antica gibbum, glandula completa cyathiformis.

Hab. Assam circa Suddyam.

1. Seed viewed opaquely.
2. Do. raphal facc.

3. Do. Long section parallel to the raphe, hence the cotyledons are opposite this organ,
4. Seed immersed in water, viewed as a transparent object shewing that the testa does not dip down into the foveola which exists in the face of the albumen.

Suddyah : Aug. 1836.

2. *Torenia calcarata* Gr.

Cal. profunde 5-partitus. Cor. ringens, bilabiata lab. superiore emarginato fornicato, inferiore 3-lobo.

Stam. 4 didynama, inclusa, filamenta paris inferioris, bases paulo supra processum dentatum gerentia. Anth. biloculares, divaricatæ difformes, loculo inferiore paris superioris calcarato. *Par inferium tantum adhærens.*

Stigma bilamellatum. Discus hypogynus cupuliformis postice incompletus.

Ovarium biloculare, placent. central.

Capsula siliquæformis tereti-subulata ex maxima partem exserta, bilocularis, bivalvis, valvis revolutis, placentis liberis persistentibus, dissepimentum exmarginibus valvularum introflexis placentæ adnat.

Semina ovatim, areolis depressis rotundatis notata.

Herba caule radicante ramis floriferis erectis, obtuse 4-gonis.

Fol. anguste lanceolata, sessilia distanter crenata. Pedicelli filiformes axillares solitarii *alternantes*, foliis longiores, fructiferi patentissimi.

Toreniæ species discrepans loculo inferiore paris superioris calcarato. Bonnayæ proximum, a quo differt tantum staminibus 4.

Hab. Bengal at *Jumalpore* in humidis. *Sept.* 23*d*, 1835.

Alternation and situation of parts, Pl. CCCCLVIII, Fig. 14.

a, *a*. Sepala.

b. Lab. superius.

c. ——inferum.

d, d. Par superum stamin. calcaratum.
e. Par. inferum.
f, f. Valvæ capsulæ.
g. Placenta libera et septa huic adnata.

3. *Toreniæ varians* Roxb. Fl. Ind. Vol. 3, p. 96.

Herbacea basi decumbens, caule ramoso acute 4-gono, fol. oppositis cordato-ovatis acutiusculis e serratis, subsessilibus, floribus axillaribus solitariis (in pedicellis 4-angulatis, subfiliformibus, latere superiore latiore folia excedentibus) nudis majusculis. Calyx 5-sepalus exangulatus, tubum corollæ subæquans.

Cor. ringens lab. superiore fornicato emarginato æstivatione extimo summoque, lab. infer. 3-lobum, lobo intermedio intimo tubo pubescente extus.

Stam. didynama. Anth. divaricatæ loculis cohærentibus paris inferioris longioris, cujus filamenta ad exsertionem dente clavata donata sunt, loculisque *superioribus* paris superioris mucronatis, inferioribus hujus paris calcaratis. Glandula hypogyna lata quasi cyathus dimidiatus.

Stigma bilamellata. Ovarium biloculare, placenta centrali, septis e marginibus valvularum inflexis. Capsula in pedunculo divaricato, cylindraceo-subulata, calycem duplo excedens, et quantum ex immaturis judicare licet, bivalvis, valvis integris revolutis, placenta centralis septis adnatis libera, Semina papuloso-muricata angulata.

Hab. Bengal Prope Hubegunge, in humidis: *Oct.* 2*d* 1835.

Huic proxima est Toreniæ sp. 1.

Buddlea.

Buddlea sp. Pl. CCCCXXII. Itinerary Notes p. 107, *no.* 94*a*.

Hab. Bootan Dewangiri in Sylvis alt. 2300, ft.

Buchnera.

Buchneræ sp. Pl. CCCCXIX. Fig. I.

Herba, spithamæa vel infra.

Caulis subtus terram squamis dentiformibus stipat.

Flores carnei, tubo viridescenti pubescenti apicem versus geniculato.

Capsula loculicida vel valve medio septifer. Placenta libera.

Hab. Burma *Isabagya : May* 10, 1837.

Veronica.

1. *Veronica,* Pl. CCCCXIX. Fig. II.

Planta annua, spithamæa ramosa, ramis purpureis, inferior prostrato decumbentibus, fol. amplexicaulia opposita lineari-oblonga, grosse dentata, fusco-viridia. Racemi terminalis axillaresque erecti bracteæ lineareis pedicellos æquantis, flores minute inconspicui cæruleo-albidi.

Cal. 4 sepala, sepalis ovatis perparia inæqualibus, 2 anticis majoribus, æstivatione.

Corolla, infundibuliformis calyce brevior profunde 4-partita laciniis sepalis alternantibus, irregularibus hoc nempe inter sepalis antica majora, æstivatione imbricata 2-lateralia exteriora, antico posticaque interioribus.

Stamina 2 epipetala, ima basin corollæ inserta, sepalis 2, posticis opposita, ideoque cum petalo postico alterna. Filamenta alba clavata, vel obsubulata, bases versus nempe attenuata, potius utrinque attenuata. Anth. basi affixæ didymæ, loculis infra divaricatis, ovatæ introrsæ albidæ, longitudinaliter dehiscentes. Pollen, læve, (*humidum tantum vide*) ovatum hinc sulcatum oblongum globosumve.

Ovarium subglobosum, hinc utrinque profundiuscule sulcatum, foliis carpellaribus nempe antico posticoque. Stylus obclavatus vel basin versus angustatus ; stigmata 2 papillosa subcapitata, antica posticaque.

Torus hypogynus dilatatus circularis marginibus parum clavatis, ovarii basin amplectentibus ; ovarium biloculare. Placentæ 2 carnosæ septo, quod quoad axin transversum, adnatæ.

Ovula 00. antitropa, funiculus brevis, crassus, foramen ad hilum latus. Tegumentum simplex nucleus inclusus, canali cylindrico a basi fere ad apicem extendente.

Capsula calyce ampliato, subæquali foliaceo suffulta, compressa, utrinque profunde sulcata, stylo stigmatibusque brunneis apiculata, subcordata, utrinque compressa, dehiscentia loculicida, valvis demum bipartitum. Placenta demum libera, centralis. Semina (vix matura) ovalia compressa, leviter brunnea. Tegumentum exterius cellulosum albumini adnatum, albumen dense carnosum parcum.

Embryo minutus in axi albuminis locatis, orthotropus. Radicula teres obtuse, cotyledone planas ? paullo excedens. Raphe linea prominula indicata ex hoc oritur faciem interiam seminis angulatum esse ; cotyledones faciebus latioribus et venis seminis parallelæ. Plumula inconspicua ? Chalaza punctum nigricans ad apicem rapheos elevatæ.

Hab. Assam. In sabulis humidis sublimosis, Diboro Mookh : *Feb.* 13*th*, 1836.

2. *Veronica.*

Herba spithamæa pedalisve erecta ramosa pubescente hispida ; fol. breviter petiolata cordato-ovata, crenato-dentata, obtuse, summis sessilibus. Racemi erecti, axillares, demum elongato foliaque superant. Pedicelli breviss. Bractea lineari-spathulata quemque fulciens.

Calyx profunde 4-partitus in laciniiis lineari-spathulatis piloso-hispidis ciliatisque, erectis, inæqualibus, 2 nempe majora, æqualia, 2 minora.

Stam. 2 e sinubus laciniæ corollæ posticæ utrinque exsertæ, inclusa.

Filam. filiformi. Anth. biloculares albidæ, loculis divaricatis,

Pollen albidum læve hinc sulcatum. Ovarium globosum fol. carpellaria secus dorsum medium longitudinaliter hispid. Stylus brevis. Stigma capitatum, papillosum.

Torus hypogynus annuliformis marginibus nempe parum elevatis, ovarii basin cingit.

Ovarium. biloculare ; ovula 00. transversa foramen hilum prope vix conspicum.

Capsula cordata, bilocularis polysperma in loculicidia bivalvis, valvis demum bipartitis, membranaceis, calyce ampliato suffulto valvularum marginibus externis ciliatis, placenta adnata.

Semina 00. albida, transverse vel ascendentia, compressa, funiculo brevi affixa extus minute cellulosa, ovaria.

Raphe nulla saltem conspicue, chalaza puncta brunnea, medium seminis versus, cotyledone apices prope.

Testa subcoriacea, albumine copioso carnoso denso adnata. Tegumentum interius nullum? Embryo orthotropus axilis. Radicula teretiuscula hilum versus spectans. Cotyledones incumbentis faciebus latioribus, verisque obchalazam seminis alternantes. Plumula inconspicue.

Hab. Assam. In arvis, versus Gubroo-Purbut Jorhauth: *March 6th*, 1836.

Folia carpellaria antica posticaque, ideoque lacinus iisdem corollinis opposita. Situation and alternation of parts Pl. CCCCLVIII. Fig. 7.

Centranthera.

Centranthera hispida Br. Digitalis stricta, Roxb.

Herbacea erecta scaberrime, fol. lineari-obtusis, obsoletidentatis, oppositis vel alternantibus; floribus solitariis in axillis foliorum, summor. floralium parum mutatorum, breviter pedicellatis, (pedicellis basi bracteis 2 linearib. majusculis) subconspicuis.

Cal. 5 partitus, sepalis cohærentibus antice spathaceim fissus.

Cor. infundibuliformа, tubo deorsum curvato, fauce subampliata limbo subæqualiter 5-fido.

Stam. didynama, filamenta pilosa. Connectiv. inter antheras pilis moniliformi-barbatum. Anth. biloculares, loculos dissimilibus, deorsum calcaratis, altero minimo quasi abortivo longius calcarato.

Pollen lanceolatum, medio sulcatum læve. Stylus filiformis, Stigma sublanceolatum, papillos. medio linea opace superum. Ovar. biloculare, placentis 2, hæmisphærias, ovula 00. Capsula calyce connivente inclusa, bilocul. bivalvis, valvis primo medio septiferis, demum marginibus inflexis, solutis quadrivalvis placentaque centralis evadit. Semin. angulata plurima. Testa laxa reticulata albumen parcum membranâ inclusum. Embryo axilis teres indivisus. Alternation and situation of parts Pl. CCCCLXIII. Fig. 15.

Hab. Bengal. Ad ripas graminosus, *Burrumpootur*, cum Torenia varians *Sept.* 1835.

Wulfenia.

Wulfenia obliqua. Pl. CCCCXIX. A.

Calyx green, teeth tinged with blue. Corolla, tube blue, and underneath white. Petal on the centre with a white cordate spot, leaves bright green, articulations swollen, tinged with fuscus.

Hab. Mishmee Mts. *March 25th*, 1836.

Schrophularineæ sp.

Herbacea erecta ramosa, fol. oblongis inciso-dentatis, floribus spicatis subsessilibus in axillis foliorum floralium incisarum solitariis ochroleucis, infundibuliform. Cal. basi bibracteolatus subbilabiatim 5-fidus $\frac{2}{3}$ dentibus inferior majoribus. Cor. bilabiatim infundibuliform 5-fida, lobis 2 superior minoribus.

Stam didynama filam. pilosa. Anth. biloculares transverse

discretæ, loculis parum inæqualibus calcaratis, apices versus hiantes, inclusis.

Stylus curvatus filiformis, stigma oblongo-spathulat. supra medio sulcatum papillosum maximum, Glandula hypogyna 0. Ovar. globosum biloculare. Placentis maximis carnosis septo subadnatis. Cor. marcescens fructus supra fissa.

Capsula globosa, bilocul. bivalvis, demum quadri-valvis septis solutis, placentæ centrales, septiferæ.

Hab. Khasyah Hills. In graminosis humidis, *Churra*: *Oct.* 12*th*, 1835.

Centrantheræ propinquæ. Testa immatura laxa arilliformis.

Scrophularineæ sp.

Herbacea nutans ramosa. Caulibus teretibus, basin versus cellulosiss. striatis, foliis petiolatis orbiculatis, celluloso-carnosis sæpius integris, interdum emarginatis, petiolis canaliculatis, floribus axillaribus solitariis speciosis rosaceo-carneis, lobo medio lat. inferior albo, luteis maculis.

Pedicellis foliis brevioribus.

Cal. campanulatus dentatus, dentibus obtusis.

Cor. ringens tubo calycem excedente, lab. superior emarginato subfornicato, inf. 3-lobo, lobo medio majore prominulo. Stam. didynama, inclusa, tubo basin versus inserta, filam. subulata. Anth. bilocul. Stylus filif. Stigma bilabiat. Glandula hypog. 0. Ovar. bilocule, placentis incrassatis, 00 ovulatis. Capsul. bas. calyce persistent. cinct. submersa. Ovula maturiusculo elevatis lineis e cellulis transversis formatis pulchre striata.

Pedicellis fructiferis incrassatis.

Hab. In oryzetis et aquis stagnantibus, Mergui, rara etiam, Tavoy copiosa: 285. *July, Sept.* 1834.

OROBANCHEÆ.

Æginetia.

Æginetiæ indica, Pl. CCCCLVIII. Fig. 16.

Parasitica, pedunculis 6, 12 uncialib. ima basin squamigeris ochroleucis, striis tenuibus purpureis; flor. solitario terminal. nutant. extus albidis cellulosis, intus atro-sanguineis.

Cal. spathaceus lateri inferior a medio usque ad apicem fissus.

Cor. subinfundibulif. medium infra angustato, deorsum curvato fauce inflata ad limbum constricta, limbo 5-fido, laciniis obtusis erectis, 1 antica (inferiore) paulo majore.

Stam. didynama tubo apicem versus inserta, filam. subulata, sanguinea. Antheræ 1-loculares inter se cohærentes, longit. dehiscent. connectivo albo, paris superioris breviorisque, hinc in processum dentiformem elongato.

Stylus deorsum curvatus crassus subulatus, stigma maximum peltato-capitatum luteum papillosum viscosum, medio foveolatum. Ovarium 1-loculare placentis 4, parietalibus sinuatis! Ovulis numerosissimis.

Capsula calyce spathaceo obtecta stylo apiculato. Placentis sinuatis aureis! Semina 00 albida testa laxa e cellulis inflatis ovatis, fibro spirali notatis, nucleo central. cellulis nonnulis interjectis superpositisve efibrosis corpusculis crebris amylaceis. Pl. CCCCLVIII. Fig. 16.

Hab. Mergue. In sylvis præcipue Bambusaceis.

Palar Maimayve, *Oct.* 1834.

No trace exists of the spiral fibres before impreg. See fig. *a.* taken before that operation.

ACANTHACEÆ.

THUNBERGIA.

Thunbergia grandiflora.

Bracteis binis coalitis hinc later. inferior. Cor. maxima, tubo pallide cæruleo, limbo saturatius pulcherrimeque. Genitalibus in sulcæ labii superioris centrali receptis, floribus solitariis axillaribus, foliis petiolatis, petiolis pedicellorum longitudinis, cordato vel hastato-ovatis, dentatis vel sinuato-dentatis, subglabris, basi 7 nervus, acuminatis. Anther basi calcaratis.

HAB. Scandens in arboribus Mergui *Pulo Gewen : Nov.* 1834.

NELSONIA.

Nelsonia tomentosa,

Herbacea, decumbens, pilis patentibus hispida, præsertim apices caulium, fol. elliptico-ovatis longiuscula petiolat. subintegris penninervus subtus albido-pallidis. Spicis axillaribus terminalibusque, glanduloso-viscosis, undique denseque imbricatis, ad basin versus bifoliatis. Bracteis ovatis foliaceis ciliatis spiraliter imbricatis. Floribus parvis purpurascentibus, solitariis in axiilis cujusque bracteæ.

Bracteolis 0. Cal. 4-partit. sepalis inæqualibus postico majore antico bifido, pilis longissimis præsertim ad bases hispidis et glanduloso-pilosis. Cor. ringens tubo brevi subinflato, ad faucem constricto, lab. super oblongo emarginato ascendente, inferior 3-lobo, lobo medio interiori breviter stipitato, rhomboideo *ascendento*, æstivatio imbricato, lab. superior exteriore, ideoque flos rectus, lab. superus purpurasceis, super sanguinea ad apicem albidum lineis saturationibus notat. lab. superior ad basin linea pilorum alborum transverse stipatum. Stam. 2 inter labialia. Filam. breviss. Anth. magnæ 0, muticæ loculis subparallelis. Torus glandulosus 0. Stylus filiformis,

stigma bilamellatum. Ovarium pilis p. calycinis conformibus hypogynis stipat. biloculare, multiovulatum. capsula ovata lanceolata compressa, bilocularia, loculis ima basin seminiferis semin 6? cuique loculo, immatura rotundato-angulata, areolata? retinaculis, 0.

Hab. In ruderatis graminosis. Mergui: *no.* 668, *Nov.* 1834.

Adenosma.

Adenosma affinis.

Herbacea erecta, strigosa ramosa. Caules articulati, articulis tumidio ob fol. inferior lapsa nudiusculi, 4-goni, fol. opposita breve petiolata ovata, obtuse acuminata serrata, subgrossa venis infra reticulatas prominulis. Spicæ terminales oblongæ subcylindricæ, hispidissimæ, quadrifariæ. Bracteæ maximæ cordatæ venosæ, apices versus subrecurva, 4-fariam dispositæ. Spica axis 4-gonæ; flores bibracteati majuscula tubo pallide limbo saturato cæruleo marginibus loborum albidis.

Cal. basi bibracteat. tubulosus, 5-sepalum, sepalis subæqualibus postico majore paululum uti bracteæ pilis capitatis longis dense tecte. Cor. infundibuliform. subbilabiat. tubo angusto fauce ampliato 5-loba, lobis oblongis subæqualibus postice profundius. fissa.

Stam. didynama exserta par quodque insertion. approximat. et corollæ pariete postice adnat. tubo apicem versus exserta. Filam. filiformia. Anth. oblongæ bases versus affixæ connectivum amplum carnosum, loculis angustis discretis longitudine dehiscent. ante dehiscent. approximatis. Pollen globosum læve.

Stylus filiformis apice curvatus supra apicem versus planiusculus et stigmatosum, stigma simplex lineare obtusiuscula.

Ovarium oblongum, apicem versus pilosum, toro globoso, solido, glanduloso insidens, biloculare, loculis 2-ovulatis, ovulis ascendentibus.

Capsula calyce inclusa obovata pilosa apicem versus, basi rotundata solida e toro orta, bilocularis bivalvis, 4-sperma, valvis medio septiferis. Retinacula subulata vix uncinata. Semina orbicularia compressa atra, diametro longiore transverso, valvis parallelo testa coriacea simplex. Albumen 0. Cotyledones semini conformes plano convexiusculæ. Radicula brevis hilum prope, inter cotyledones fere obtecta potius inter earum plicaturam nidulans.

Hab. Assam. In collibus, prope *Anjelly : Nov. 7th*, 1835.

Certe Acanthacea, Adenosmæ etiam affinis.

Hygrophila.

Hygrophila obovata, N. ab. E.

Herba erecta, ramosa, pilis scabra, caulibus ramisque obtuse 4-gonis. Foliis petiolatis oblongis vel obovato-oblongis obtusis, in petiolem decurrentibus scabris. Inflorescentia in axillis aggregata vel subcymosa, floribus confertis subsessilib, albidis, lab. infra marginibus pallide cæruleis in medium albido, punctis cæruliis Cal. basi 3-bractiato, quorum antico majore, bracteis oblongis foliaceis, ciliatis nervosis.

Cal. fere admedium 5-partita, laciniis lineari-subulatis, subæqualibus pilosis. Cor. subpersonata, tubo calyce breviore, fauce ampliata, lab super subgaleato bifido, laciniis emarginatis inf. 3-lobo, lobis emarginatis. Palato subprominulo piloso. Stam. didynama, filam. utruisque lateris basibus adnata! Anth. 2-locul. loculis parallelis, subsagittat. Stylus filif. stamina superans scaber. Stigma 1-labiata altero superoque albortivo.

Ovarium toro glanduloso insidens, bilocul. pluri-ovulat. Ovulis ascendentibus. Retinaculis parvis. Capsula subcompress. calycem persistente superans polysperma, Sem. retinaculis subulatis distichis subtensa, ciliata.

Hab. Mergue in aquosis : *no.* 688, *Nov.* 1834.

Didynama normalis, uto dispositis stam quamvis, superum inferumque utriusque lateris basibus adnata, ciliarum organis atro ut Ætheilema. sed perfectior.

Hemiadelphis.

Hemiadelphis polysperma. N. ab. E.

Caulibus repentibus radicant. Ramulis ascendentib. sub 4-gonis, foliis lanceolato-obovatis obtusis, subserratis, subintegrisve. Spicis terminalibus foliosis, floribus solitariis in axillis, foliorum floralium, ciliatorum pallide purpureis inconspicuis, bracteolis linealib. sepalis longioris latior.

Cal. bibracteolatus, 5-partit. dentibus setaceis æqualib. apicibus sphacelatis. Cor. infundibulif. ringens, extus pubescens, tubo calycis longitud. fauce subinflata, lab. super. rectum nec ascendens emarginat. infer 3-lobum.

Stam. 2, rudim. 0, filam. subulat. anth bivalve loculis parallelis. Pollen globos. læve.

Stylus filiform subexsertus, pubescens. Stigma 1-labiatum. Ovar. 2-locule, a basin multi ovulat. retinaculis uncinatis subtensa.

Æstivat. lab. inf. super involvens, deoque flos. resupinat.

Hab. In aquosis. Mergue, *no.* 726, *Dec.* 1834.

Dipteracanthus.

Dipteracanthus prostratus.

Scabrella, repens, caulibus sub 4-gonis, foliis ovatis obtusis, subcrenatis, venosis, floribus solitariis axillaribus, subsessilibus.

Bractiæ 2 foliaceæ petal foliis conformia, ad basin cujusque floris.

Cal. profunda 5-partita, sepalis æqualibus, setaceo subulatis. Cor. infundibul. tubo calycis longitudinis fauce subinflato, limbo subæqualiter 5-lobo.

Stam. didynama inclusa, filam. subulatis rectis inclusis, perparia ima basi adnatus. Anth. bilocul. loculis parallelis longit. dehiscent.

Stylus subulatus, stamina paulum superans, stigma 1-labiata, lab. super minimo. Ovar. toro glanduloso insidens, pilosum biloculare multe ovulat. Retinaculis 0. ovulis ascendentibus. Capsula bilocul. 5-6 sperma, apicem versus e sperma.

Hab. In umbrosis Mergue, Moulmein: *no.* 204, *Augt.* 1834.

Ætheilema.

Ætheilema.

Decumbens, radicans hispide, caulibus 4-gonis sulcitis; fol. ovatis *valde* inæqualibus in petiolum attenuatis acuminatis, obsolito-serratis, nervosis. Racemis compositis axillaribus terminalibusque foliaceis, secundis glanduloso-viscosis, floribus minutis albis, foliis floribus decussatis distichis, floribus ex axillis foliorum majorum, 3-4 fasciculatis. Bractea foliacea late cordata fasciculum quemque fovente, *pedunculo flores gerente* petiola bractia basin versus adnato.

Cal. 5 sepalo postico maximo foliaceo cordato ovato sepalis ciliatis, glanduloso-pilosis, reliquis linear setaceis, 2 inferioribus majoribus. Cor ringens tubo calyce paulum breviore medium versus, obsolete geniculatis, limbo 5-partito, lab. super. bifido, inferior. 3-fido, lacinus majoribus.

Stam. 4 didynama medio tubo (parte geniculate) insertione approximata. Anth. bilocul. inclusæ, loculis parallelis.

Stylus filiformis inclusus, stigma bilabiat. labio superiore, abbreviato rotundato.

Ovarium toro glanduloso parum elevato insidens bilocul. loculis 2 ovulatis ovulis ascendent retinaculis suffultis. Capsula, bilocul. loculis 2 ovulatis anticis posticisque. Semina pallide brunnea, retinaculis uncinatis subtense complanata, tegument duplex, exterius pilis cilialum. Cotyledones cordato-or-

biculatæ. Radicula brevi hilum spectans. Plumula inconspicua. Fig. 17, Pl. CCCCLVIII.

Hab. In Pagodæ antigicæ minis Mergui: *no.* 637, *Nov.* 1834.

Ætheilema.

Ætheilema mucronata?

Herbacea, decumbens radicansque. Caulibus 4 gonis, fol. lineari-lanceolatis utrinque acuminatis subintegris subscabris, sæpius inæqualibus, capitulis axillaribus terminalibusque et tunc aggregatis dense bracteatis. Bracteis secundis scariosis 4, fauce imbricatis hispidiss. ciliatis nervosis. Bracteolæ 2, linearis, acutæ pungentis cinque flora.

Cal. 5 sepalus, sepalis ciliatis, sepalo postico majore, lateral intermediis. Cor. ringens, fauce sensim ampliata, lab. super breviore emarginat. inf. 3-fido, tubus albus, lab. super faux que albo brunneo guttat. lab. infer laciniæ albæ.

Stam. didynama rud. 5 to 0, fauci inserta. Filam. subulata, brunneo-guttat. Anth. bilocul. locellis oblique positis, loculi superior margine supera denticulato-ciliata, inferioris margine infera, sed multo minus et versus apicem tantum connectiv. hispidum. Stylus filiformis lateri inferiore pilosiusculus, stigma capitat. Ovar. apicem pilosum, cupula glandulosa subintegra insidens, medio foveolat. 2 loculare, ima basin fere 4-ovulat. ovulis ascendentib. retinaculis suffult. Testa, semin. *immatur.* pilis densis *simplicibus* ciliata.

Hab. Mergue. In apricis, ins. Madam: *no.* 924, *Jan.* 1835.

Lepidagathis.

Lepidagathis sp.

Decumbens, radicans, herbacea pilosa, foliis ovatis, summis lanceolat. in petiole attenuatis, subintegris, caulibus compressis 4 gonis. Bracteis, ciliatis vix scariosis, lanceolatis acuminatis. Cor. tubo albido limbo carneo, lab. utroque præsertim super maculis brunneo-purpureis. Filam

eodem colore maculat. Bracteæ 3 cuique flori, antico majore.

Cal. profunde 5 partit. sepalis inæqualib. postico majore, sepala bracteoque foliaceæ, vix scariosæ pilis longis ciliatæ.

Cor. extus pilosa, lab. infer basin versus, tuboque intus pilosis, *pilis deflexis.*

Anth. loculis divaricat. margo altera pectinata, *(i. e.)* one anther has the right margin so, its fellow the left, loculis sæpius basi pilosis.

Ovarium *apices versus* pilosum. Stigma capitat. nec emarginat. cupula glandulifera ovarium basin cingens. Ovarium 4, ovulat. *loculorum basibus fertilibus.*

Hab. In sylvis. Mergue. *Oct.* 1824. Unicum specimen tantum ad huc vidi. *no.* 567.

Dydynamia genuina, *i. e.* par superum stam. brevius; Vasculorum fasciculus *centralis* labio superiore de est junctionis linea alba parte *colorata utrinque elevata.*

Acanthus.

Acanthus carduaceus Gr. Pl. CCCCXXVII.

Itinerary Notes p. 144 no. 688. tab. 57.

Hab. Bootan mountains at Bhoomlungtun and Oongar.

Dilivaria.

Dilivaria volubilis. ?

Scandens glabra, carnosa, fol. opposita ovata mucronata acuta integ pallide viridescentia, interdum obovata. Spicis terminalibus erectis, densifloris, bractea ovata foliacea calycem excedent. floribus majusculis erectis primo intuitis omnino papilionaceis.

Cal. 4-sepalus, sepalis anticis posticisque ovatis breve acuminatis, maximis, 2 lateral multo minorib. oblongis, acutis. Cor. unilabiata, labio arcte declinato antico, 3-fido lacinia media minore.

Stam. 4 subdidynama aclinata fauce pilosa, inserto,

filam. subulata basibus incrassat. Anth. terminales connivентes, 1-loculares, loculor. marginatim præsertim inferis dense sericeo-barbatæ (marginib. super, paris superior minus). Pollen ovatum læve hinc sulcat. Stylus subulat. aclinat. Stigma bilamellat. lamellis minimis, (*postica majore*) connivent. stigma simplex obtusiusculum simulans. Ovar. toro glandulo-so, insidens basi 4-ovulat. bilocularis. Retinacula ovulor. brevia.

Affinis Dilivariæ volubilis sed bractea.

Hab. Mergue scandens inter Rhizophoreus. Ins. Madam: no. 982, *February*, 1835.

Graptophyllum.

Graptophyllum pictum N. ab. E.

Fruticosa, 6-7 pedalis ramulis pallide brunneis albo-tinctis, apicibus omnino albis, compressis glabris, fol. ovato-lanceolatis acuminatis subcrenulatis, marginibus cartilagineis coriaceis, breve petiolatis plus minus albo notat.

Racemis ex axillis foliorum summor. foliis brevior basi foliolosis, subsecundis, floribus sæpius solitariis præsertim apices racemorum versus, bases versus 2-3 aggregatis, conspicuis maximis, sanguineo-purpureis. Pedicellis solitarius basi 2-bracteolatis.

Cal. basin usque fere 5-partit. laciniis angustis acutis erectis. Cor. infundibulif. ringens, tubo $\frac{1}{2}$ unciali, curvato, fauce sensim ampliata, marginibus demum revolutis, lab. superiore ascendente bifido, genital. foveol. inf. 3-lobo, lobis lineari-oblongis, lateralibus arcte reflexis, omnibus demum revoluto-convolutis, æstivat. imbricata, et ante anthesin resupinata.

Stam. 2 fauci exserto. Rudim. paris alterius superiorisque minima, latere superiore paris fertilis adjecta. Filam. lab. superior breviore, filiforme. Anth bilocul. loculis parallelis, connectivo breve apiculat.

Stylus longissimis lab. superus paulo superans, filiformis stigma capitat. transverse sulcat.

Ovar. toro ampliato eoque basin circumdatum accretumque insidens conicum, biloculare, loculis bases versus solidis apicibus 2-ovulatis ovulis ascendens, retinaculis subtensis.

Hab. In horto Mergue : *no.* 902, *Jan.* 1834.

Limbus corollæ rugosa, glandulisque clavatis albidis globosis crebris interspersus.

Æstivat. lab. superum ob resupinatione infer aliud involvit. Justicia puta. L.

Adhatoda.

Adhatoda vascica? N. ab. E.

Suffrutex erectus ramosis ramulis obsoletissima 4-gonis, ad articulos tumidis, fol. lanceolatis utrinque præsertim ad apicem attenuatis repandum integra glabra. Spicis axillarib. oppositis longe pedunculatis, apice tantum floriferis sub 4-gonis, floribus 3-bracteatis, bracteis foliaceis, 1 maximo ad basin cujusque, 2 lateral (not on the same plane) minorib. interiorib. spathulat.

Cal. æqualiter profundeque $\frac{2}{3}$-5 partit. Cor. ringens, tubo sepalor. longitudine, fauce ampliato, limbo ascendente, lab. superiore ovato fornicato emarginato secus lineam mediam plicato, plicca stylum amplectent, inf. subporrecto, 3-lobo, lab. super. later versus, loboque medio inferior venis rosaceis.

Stam. 2 fauci inserta, labiis alternantum, filam subulat. ascendente, anth. bilocular. loculis dislocatis, connectiv. plus minus glandulosis, loculis infer breve calcarat. Stylus ascendens in succo lab. superiore recept. piloso-pubescens, stigma emarginat. Ovar. antica posticeque pubescens disco glanduloso insidens, basi sterile, supra 4 ovulat.

Hab. In rudiratis. Mergue Kulweng : *no.* 1061, *March,* 1835. Legi etiam in super Demtharot, 1834.

Æstivat. imbricato in lab. superior intimo, lab. medio lab. inferior *extimo.*

Adhatodæ sp. Pl. CCCCXXIV.

Flowers spicate. Bracteæ *belonging to the ramifications*, 4-rowed. Posticous, not producing any buds in their axillæ, the remaining three flori gemmiferous.

Calyx subæqualis. Cor. tubo geniculato, bilabiato, lab. super. fornicato emarginat: inf. 3-lobo, lobis subæqualibus. Palato subprominulo.

Stam. 2. sterilia 0. Anth. locul. divaricati obliqui. Stylus duplicatam lab. superioris obtectus, stigma parvum bilobum. Ovarium disc. glandulosum terminans, 4-ovulat. Pollen 1-2 plicat. plicis medio poriferis.

Frutex, foliis lanceolatis. Spicis axillaribus bracteis tetrastichis posticis vacuis. Flores magni bibracti. Folia basi æqualia.

1. Alabastrum.
2. Flower laterally.
3. Ditto front.
4. Corolla laid open.
5. Anther front.
6. Ditto back.
7. Ditto dehisced.
8. Pollen opaque.
9. Ditto in water $\frac{1}{2}\sigma$
10. Pistillum.
11. Ovary transverse.
12. Ditto longitudinally
13. Ovula.
14. Ditto long section (iterum examinandum)
15. Partium situs et alternatio.

I believe the ovary to be dimerous, the fascicles of style being two, and nothing appearing to indicate the non development, two additional parts.

The æstivation of this order appears always the contrary to that of Labiatæ, the lower lip being external, and the middle lobe most external. There are no rudiments of

sterile stamina. The nucleus appears to cohere with the single tegument.

The direction of the flowers of Peristrophe before the twisting of the tube is, reasoning from analogy reversed: is the peduncle therefore twisted? I find in Meyenia and some others, that, if the situation of the inflorescence be such, that the upper labium be inferior or nearer the earth the peduncle becomes twisted. And this seems to be the cause of the twisting because in Thunbergia grandiflora when the situation of the upper lip is superior, as it sometime remains, no twisting takes place.

It would be worth while ascertaining whether the twisting might not be determined in all by deflexing the inflorescence so as to bring its point near the earth.

The presence of three bracteæ to the flowers is constant? And points out the evident tendency to dichotomy that exists throughout the order, see N. ab. E. Of these the anticous one does not belong to the flower developed, for this being really terminal has no bracte but to the partial ramus of inflorescence, the lateral ones represent the situation of two lateral flowers not developed. That is in the present instance but if the flower be pedicelled then the lateral ones would correspond to two lateral pedicelli. In the former case the limits of the partial inflorescences are defined, in the latter they are not defined.

Gendarussa.

Gendarussæ sp.

Frutex erectus, ramis obsolete 4-gonis, atro-purpureis, fol. angusto-lanceolatis breviter petiolatis obtusis subemarginatis repando-crenatis. Spicis terminalibus et in axillis folior. summor. floribus termatim, aggregatis in axillis bracteam linearium, acutem dimiditem verticellat. albis, rubro punctat. lab. inferior rugosulo. Cal. 5-partit. sepal. æqualibus subulat. Cor. bilabiata tubo compressa, lab. superiore lanceo-

lata emarginata, vix ascendentia ; infer, 3-fido, rugosulo. Stam. 2. Anther bilocular. loculis obliquis, inferior interioribusque, basi calcarata. Stylus filiformum, stigma emarginata obtusum. Ovarium abasin 4-ovulat. cupula glandulos. brevi insidens.

HAB. Mergue. In hortis Ins. Madamaca. Culta: *no.* 1028, *July*, 1835.

JUSTICIA.

Justiciæ sp. Pl. CCCCXXVI.

HAB. Nempean in the Patkye mountains between Assam and Burma : *March* 20*th*, 1837.

Justicia nasuta.

Suffruticosa, floribus albis, tubo gracile elongato, viride, lab. super. cor. ringentes angustissimo, lineari-emarginat. ascendente, infer. latissimo, 3-lobo, deflexo, faux angustissimo. Stam. 2 post anthesin inter labiam extrorsum flexa. Stylus subexserta in canalem plicamve lab. superior recept. Stigma bifidum. Cal. æqualis, 5-sepalus, sepalis lineari-setaceis, cupula glandulosa ovarium basin cingens. Ovar. a medio paulo infra 4-ovulat.

Caule angulat. fol. lanceolat. in petiolem attenuata. Cymis dichotomis axillarib. terminalibusque paucifloris. Cor. labio superiore basin versus purpureo-fusco-punctata. Pedicellis basi 3-bracteat. bracteis minimis setaceis.

HAB. Mergue: *no.* 1059, *March*, 1835.

Justiciæ sp.

Suffruticosa foliis caulibus compressis magnis, 6 8 uncialibus, ovato-lanceolatis crenato-repandis, acuminatis luteo-viridescent. Racemis terminalibus bracteatis, bracteis foliaceis lanceolatis, floribus inconspicue solitariis vel 2, 3 in pedicello quoque.

Cal. subæqualiter profunde 5-partit. Cor. ringens, tubo .

calycis sepalis breviore, lab. superior subcordato emarginato, inferior 3-dentato 2 elevatis in tubum decurrente (viridescent albida, maculis minimis sanguineis. Stam. 2-labiorum sinus opposita, fauci inserta, filam filiformia, rubro punctata. Anth. bilocul. loculis parallelis infra mucronulatis (calcaris rudimenta extus pilosis, nec ciliatis intus (in sinubus) glanduloso-pilosæ glandularia capitibus maximis, stylus filiformi, ad apicem glaber, bifidum, stigmata simplicia. Cupula hypogyna integra ovarium basin cingens. Ovarium pilosum, 2-loculare loculis 2-ovulatis, ovulis retinaculis suffultis.

Hab. Mergue in umbrosis, *Pulo Gewen: no.* 635, *Nov.* 1834.

Rungia.

Rungia parviflora N. ab. E.

Herbacea ramosiss. erecto scabra. Caulibus angulatis sulcatis ; foliis lanceolatis vel lineari-lanceolatis, utrinque attenuatis, bases versus petiolisque ciliatis ; spicis axillaribus terminalibusque, solitariis vel 3-4 aggregatis, secundis. Bracteis scariosis, ovato-lanceolatis distichis obliquis, ciliatis marginibus (præsertim infera) scariosis. Floribus 3-bracteolatis bracteola antica majore obovato, marginibus scariosis ciliatis, lateral. oblongis, concavis emarginatis structuræ ejusdem.

Cal. sepalus, subbilabiatus sepalis (2 superior) lineari-acuminatis ciliatis.

Cor. tubo cylindrica. sepalis breviore ringens, lab. superior ovato subacuminato, inferias 3-loba, lobis subæqualibus, *oblique rugoso.* Stam 2, fauci inserta inter labialia? inclusa, filam filiforme. Anth. bilocul. loculis paulo dislocatis, altero supero interioreque altero parce pilosa, basi processum lobuliformem gerente. Stylus filiformem, stigma bifidum, inclusum. Ovarium cupula brevi glandulosa insidens, 2-locularis loculis basi effætis, supra 2-ovulatis ovulis retinaculis subtentis.

Corolla extus pilosa.

Æstivat. imbricata, lab. inferior superum obtegente! hoc notu resupinata sit corolla.

Hab. In sylvis ruderatisque umbrosis. Mergue, etiam Molmein qua copiosa cresent. *no.* 663, *Nov.* 1834.

Capsula ovata compressa, 2 locule, loculis 2 spermis. Semina compressa *verrucosa loculis ima basin seminiferos* brunnea.

Capsulæ parietes membranaceæ, margines folior. carpellorumque approximatæ, sunt osseæ, supero quoad axim, infero quoad filamentum (N. ab. E.) ante semin. concentro-rugosum. Embryo Fig. 18. Pl. CCCCLVIII.

Obs. The cells of the scarious parts of the bracteæ are beautifully sinuate a few glanduliferous short hairs are interspersed. The ciliæ are jointed and punctuate, punctuations exceedingly ruminate. Interspersed in the foliaceous part are many oblong uncoloured cells running perpendicularly or nearly so with the surface, these are very verrucose, these verrucæ are elevated considerably above the cell. They occur in the sepals but in fewer numbers.

Phlogacanthus.

Phlogacanthus curviflorus, Pl. CCCCXXV.

Frutex erectus valde ramosus, 6-8 pedalis. Caulis viridis, tumesentiæ articulor. fusco-tincti, fol. superne saturato-viridia subtus albide et rediculata.

Flores penduli albi, genitalia incluis. Corolla fere Daturæ infundibulif. fere regularis tubo angulato, infra angustato, calyce nempe clauso, laciniis corollæ erectis, vix distingueres quid sit tubum superum inferumve.

Hujus generis est Acanthacea e ripis Nammaroan.

Kuttack-Boom : *March* 16*th*, 1837.

Acanthaceæ, sp. Pl. CCCCXXVIII.
Itinerary Notes p. 106.

Hab. Bootan. In sylvis *Dewangiri*.

Acanthaceæ sp.

Herba prostrata radicans, pubescente pilosa, caulib. 4-gonis, foliis ovatis serratis, flores, pallide cæruleo-purpurei, lab. super albido dimideo resupinato.

Cal. 2 bracteat. bracteis setaceis 5 sepalus, sepalis 3 exterior maximis cordatis, pilosis ciliatis, 2 intermedius linearisetaceis. Cor. ringens, tubo calycem excedente, lab. super subascendent. album emarginatum, infer. 3-dentat. purpureum tubum medium infra angustat.

Stam. 4 didynama, parte constricta tubo inserti. Filam. filiform. Anth. paris infer longiorisque, 1-loculares, locula altero abortiento paris superior bilocular. loculis parallelis, connectivum carnosum.

Stylus plano-clavatus, stigma carnosa bilabiata, labiis subcohærentib. Torus glandulosus subcyathif. Ovarium 2-loculare, loculis a basin 00 ovulatis. Retinaculis 0.

Hab. Mergue. In humidis, apud Tharapown. *no.* 820.

Gen. novum. Tribus Nelsonicæ. Cal. bibracteolatus, 5-sepalus, sepalo postico 2 inferioribusque maximis cordatis, 2 intermediis minimis lineari-setaceis. Cor. ringens, lab. superior emarginato, infer. 3-fido. Stam. 4 didynama, anth. par inferioris 1-loculares superior bilocular. loculis parallelis. Stylus complanato-clavat. Stigma bilabiat. labiis connivent. Ovarium a basin multi-ovulat. urceolo glanduloso insidens.

Inflorescentia spicata foliaceo bracteat. flores dimidio resupinato.

CYRTANDRACEÆ.

Thoughts on Cyrtandraceæ.

Definition of the order inflorescence etc. which in its dichotomy and bracteation often approaches to that of Acan-

thaceæ. Remarks on the various organs, and appendages of the axis, the obliquity and inequality of the leaves, analogous to the same in Acanthaceæ. Affinities.

I believe Dr. Brown does not separate these plants from Gesneraceæ or Gesnerieæ. The differences assigned by Lindley in his Introd. 2*nd* edition, are not defensible, since in my Cyananthus the ovary has a tendency to become inferior, neither is the absence of albumen constant.

From Scrophularineæ they may (when in flower) be distinguished at once? by the constant presence of 5 stamens in one form or another, whereas the 5th in Indian Scrophularineæ is as constantly absent. I have before observed that the bilocularity of the fruit of this last order is not constant. Is there no difference in the æstivation of the corolla.

On the whole, after Gesnerieæ, they approach nearest to Acanthaceæ especially in habit and inflorescence. The gyrate form is very remarkable and was first pointed out by Brown in his Aikinia; every degree of irregularity occurs in the corolla from ringent to subregularity, the tendency towards the latter form is however rare. The calyx affords but few characters, my Cyananthus however is at once known by its petaloid pentangular valvate calyx.

The stamina are worthy of much attention, Cheilosandra having the anthers opening in a valvular manner, the valve being compound.

The hypogynous disk is less developed than in Scrophularineæ, neither has it a tendency towards assuming the form of an additional series of stamina, which it has in the order referred to.

The ovarium is constantly unilocular or of bilocular form, the placentæ do not cohere, it is therefore only bilocular by approximation, not cohesion of parts. Cyananthus is remarkable for its fungous placentæ.

The stigma affords generic characters the general form, is perhaps bilamellar which may be determined by the vascular fascicles of the style.

The habit is peculiar and is at once sufficient to distinguish them.

Verbenaceæ are not easily distinguished by characters except perhaps that of the placentation and the definite number of ovula. But of all these orders the æstivation should be carefully examined; the 5th stamen is absent in Verbenaceæ.

Is not my Chiliandra Wallich's Corisanthera ?

Of this order India has many representatives, Æschynanthus and Incarvillea being the most numerous both genera averaging (several, say) 5 species each, 10.

Chiliandra, ...	5
Slackia, ...	1
Loxotis, ...	2
* *Tetraphyllum*, ... • ..	1
* *Geniculus nema*, ...	2
Cyananthus, ...	1
Chirita, ...	1
Stauranthera, ...	1
Epithema.	1
Martynia ?	1, 28

It may be considered to contain 35 or 40 species.†

They are generally hill plants delighting in wet very shady spots, few of the species are to be found above 4000 ft. The plains possess but few and even these have probably escaped from hills. Of the Indian species the most widely distributed are some of the epiphytical Æschynanthi or Incarvilleæ, and of these about 3 species are found on plains. Martynia has likewise an extensive distribution. The remaining appear to be local, especially the small one from Madamacan.

* Temporary names referring to undescribed genera in the collection of the author.

† Species referred to generally as examples.

Didymocropus oblonga, Pl. CCCCXL. Fig. III.

Didymocerpus aromatica, Pl. CCCCXL. Fig. IV.

Æschynanthus ramosissimus, Pl. CCCCXL. Fig. V.

Lysionotus ternifolius, Pl. CCCCXL. Fig. VI.

Structure of the leaves of Æschynanthus, Figs 1, 2, 3, 4. Pl. CCCCXLI.

Both cuticles are very thick, the upper one particularly and are beautifully transparent, composed of angular cells placed at right angles with the axis. These cells become rounder and much shorter towards the surface.

The part of the leaf in which the green matter is deposited is exceedingly narrow and very opaque.

The primary vascular fascicle does not occupy the exact axis, but is nearest the inferior surface.

The inferior cuticle is composed of rounded and angular cells of large dimensions, both sections give at first the idea of pores existing in the surfaces of the cells. The cells contain a few green ovate or roundish corpuscles.

The intercellular spaces are extremely distinct and vary much in shape and dimensions. On examining with high powers the apparent pores, which are of large diameter and very distinct, one is induced to reject the idea of their being apertures.

1st. Because the appearance of a membrane covering them is sufficiently distinct, and like the remainder of the wall of the cell examined, green corpuscles are frequently seen adhering to them.

2. Because on varying the light, they do not assume the exact colour of the field in which they are viewed, but have the same appearance as the other cells.

3. Because I have seen torn portions of membrane adhering to their edges some of which then had every appearance of being open.

4. Because on looking at the attachments of the cells one with another, we find them exactly of the same shape

Clinta grandiflora, Pl. CCCCXL. Fig. VII.
Platystemma violoides, Pl. CCCCXL. Fig. VIII.
Stauragyne argentia, Pl. CCCCXL. Fig. I.
Aikinia brunonis, Pl. CCCCXL. Fig. II.

with these apparently pores, and in detaching the covering, and the cells one from another, we increase their number.

5. Analogy is against their being pores, no vegetable membrane having yet been demonstrated to be visibly porous.

Dissection proves them to be not pores, they are in fact merely impressions of attachments of the contiguous cells, see fig. 4.

The large size of the intercellular spaces is evidently adapted to the thickness of the cutis, and to allow of a free transmission of air, to the central green part. These spaces communicate directly with the stomata. This is scarcely to be demonstrated by transparent sections, but is by the opaque, in which we see the spaces filled with air reaching frequently to the outer layer of the cutis, in which stomata abound. It is a curious fact that no intercellular spaces exist, nor does a transverse section give any appearance of pores in the cells *between the midrib and outermost layer*. These cells are angular, much more so than those not immediately adjacent to the midrib. They contain few if any green corpuscles, see fig I. The outer layer immediately opposite the midrib is destitute of stomata, the midrib does not appear to ramify, and is well supplied with spiral vessels arranged in a reniform manner.

The stem presents nothing peculiar, the cells of the pith abound in transparent granules.

The stomata are small as in most succulent plants.

Mergue: *Nov. 7th*, 1834.

CHILIANDRA.

Chiliandra obovata, Gr. Pl. CCCCXXXVIII.

Suffrutex 3 pedalis ferrugineo-villosus. Caulis crassus, simplex apice cum petiolis dense.

Folia opposita seniora petiolata, petiola crassa, basi sub-

connata et annuliformantis caulem cingentem, superne planiobovata in petiolem decurrent. magna, carnosa, fragilia breviter acuminata serrata, supra saturato-viridia lucida, adpressa potius arachnoidea villosa demum glabrata, infra albida adpressa pallide ferrugineo-villosa arachna demum inconspicua sed persistente, longit. pedalia vel ultra paulo, latit. extreme spithamæ, juniores subtiss. vere nivei, vernatio accumbens marginibus inferne involutis.

Venatio. V. primaria (costa) crassa infra quam maxime prominula, v. secondaria conspicuosissima simplex oblique et leniter arcuatem currentis ad margines, intra quam terminant. more evanescente, terminationes margine fere parallelæ et apicem folii versus spectantes. Tertiariæ quartariæque quam maxime inconspicuæ.

Stomata (paginæ inferioris tantum).

Inflorescentia axillaris, cymosa; cymis binata termatimve aggregatis pallide ferrugineo-villosis basi bracteatis cernuis pendulisve petiolatis excedentibus, fastigiatim divisis dichotomeque.

Bracteæ basilares carnosæ, dense ferrugineo-villosæ.

Bracteæ divisionem florumque lanceolatæ concavæ pedunculorum colore, *i. e.* carneæ, eodem more villosæ aspectu scariosæ.

Flores dichotomarum sessiles binalæve mediocres, læte rosacei, tubo fundo superne vel ad basin labii superioris subatro-purpureo, inferne albo, inodorato. Pedicellis breviuscula interdum bibracteata, flore uno nempe abortivo.

Calyx profunde 5-partitus, laciniis imbricatis, lanceolato linearibus persistentibus subinæqualibus, dense ferrugineo-villosis apicibus subglabratis intus glabris carneis patentib. post lapsu corollæ clausis.

Cor. bilabiata subrotata, tubo brevissimo labio utroque patenti-reflexo superiore labio bifido, lobis rotundatis latissimis, utroque demum inferiore 3-lobo, lobis angustioribus reflexo, præsertim supero, rotundatis, basi utrinque quasi foveolatim, infero primo porrecto.

Stam. 4 fertilia, quinto rudimentario minimo dentiforme purpureo sanguineo subdidynama, par superus nempe brevius. Filamenta brevissima, cellulosa crassa, sursum curvata *i. e.* declinata, fere semel torta semi-tort. Antheræ basi affixæ, rotundatæ, connectivo lanceolato angusto, marginibus antheræ huic contiguis sanguineo-purpureis, antice glandulosæ uniloculares, valva semicompleta antice transversum dehiscentes tuncque bilabiatæ.

Pollen pallide flavescens, glabram, anguste oblongum 3-sulcatum.

Glandula hypogyna cupulata lutescens integra ovarium basin cingit.

Stylus declinatus, glaber, subulatus, crassiusculus, albus, fasc. vasor. 2, distantes, centro canali stigmatico conspicuusculo perforato. Stigma simplex obtusum obliquum.

Ovar. glabrum ovato-rotundatum, 1-loculare foliis carpellaris anticis posticisque vix omnino superum, septis fere completis, in placentis binis extrorsum revolutis continuatis. Ovula 00, minuta placentarum facie exteriorum affixa, simplicia nempe tegmeni distinctæ nulla foramen potiusve situs intrantiæ boyaui ad hilum prope.

Endothecum cellulæ conspic. fibrosæ, rotundatæ fibris simplicib. vel rarius divisis.

Æstivat. corollæ imbricat. lab. super lobis lateral labii inferioris partim overlapped, lobo medio lab. inferious omnino externo.

Obs. Genus notis pluribus apte charactere præcipueque ob antheras anomalas, et prorsus insolitas. Initio bilocularis sunt, loculis bilocellatis, sitis etc. omnino normalis nempe e thecis 2 lateraliter (parallelis) stipita, (filamento) insertis. Posteriorum limites quasi loculorum obsolete fiunt, locellique minores et interiores quoad filament. firme cohærent. Limites horum locellorum a medio infra oblateriantur. Ex his oritur dehiscent. anomalis, valvula inferior semi-completa composita est e partibus superioribus locellorum inferiorum utriusque paris loculorum.

Margo dehiscentiæ idem est ac in antheris normalibus quamvis per dimidian solitam longitudinem currit.

The great anomaly is the intimate cohesion of the two loculi, along the margin which in all others is distinct, and in the composition of the valve. This is the only instance of the kind I know, I refer to this formation in my short paper on Rhizophoreæ, but was then unaware of the existence of an instance. All instances of the like dehiscences that is not lateral to the filament, arises probably from such cohesion, *i. e.* if there is no torsion of the filament. Lindley mentions its existence in a species of Diospyros, but does not state to what it is owing.

[Examine the situation of the anthers in the bud, as to what change arises from the twisting of the filament.]

Anth. alabast. ante filam. torsionem introrsæ, saltem quoad labia dehiscentiæ. The effect of the twisting seems to be to render the anthers more extrorse.

1. Corolla sometime before expansion.
2. Flower : shortly after expanding, seen laterally.
3. Do. sometime after expansion.
4. Front view of no. 2.
5. Corolla laid open between the lips.
6. Outer view of young anther.
7. Front or inner of do.
8. Lateral do.
9. Front of anther of no. 1.
10. Lateral view of mature anther.
11. Outer, or back of do.
12. Inner of do.
13. Lateral view of one dehisced.
14. Front do.
15. Do. lower valve, divided, so as to shew the interior of the anther.
16. Long section of anther through the centre, this in fact corresponds to one of the original cells seen in the young states.

17. Transverse section of mature anther at the junction of the valve or lower lip.
18. Transverse of young anther, nos. 6, 7, 8.
19. Pollen dry.
20. Do. immersed ($\frac{1}{2}\frac{1}{0}$.)
21. Fibrous cells of the endothecum of the lower lip of no. 14.
22. Pistillum.
23. Ovar. transverse section viewed obliquely.
24. Do. of style do.
25. Long section of ovary shewing that it is not altogether superior.
26. Ovulum of no. 22.

CYANANTHUS.

Cyananthus umbrosus Gr., Pl. CCCCXXXVII.

Radix fibrosa, caule basi decumbente terete crasso carnoso. Fol. subopposita alternave (petiolis uncialibus,) oblongo-ovata acuminata, carnosa, basi valde oblique, seniora subintegra, juniora irregulariter serrata, fructus racemosa, racemis erectis terminalibus interdum axillaribus, scabrellis. Bracteæ ovatæ lividæ, deciduæ. Pedicelli scabra.

Aikiniæ videtur affinis. Cal. petaloideus, 5-partitus, æstivatione valvatus. Cor. subregularis, 5-partita.

Stam 4 fertilia æqualia.

Stigma capitat. Capsula calyce aucto cincta. 1-locularis, circumscissa. Placentæ 2, fungosæ, liberæ persistent. faciebus internis sterilibus. Semina sub sessilia ex albuminosa.

Alabastra azureo-cærulea, pentagono-alata. Sepala bases versus coalita, cæterum 3-angularia æstivatione valvata, fructus ampliata carnosa cæterum conformia, erecta.

Cor. monopetala, subhypogyna tubo brevi, laciniæ 5, rotundatæ, æstivatione imbricatæ, venosæ, unica majorique exteriori cæteræ seriatim imbricatione interiores, alba cæruleo-tincta, basin versus intus lutescens.

Stam. 4 basi corollæ inserta, laciniis ejus alternantia introrsa. Filam crassa brevia. Anth. cordatæ, introrsi pubescentes, basi affixæ, alabastri 4 loculares, loculis bilocellatis. Rudimentum quinti dentiforme, hinc laciniæ corollinæ minoris ? situm.

Ovarium 5-angulare, angulis rotundatis, pilis uncinatis brevibus pubescens, ima basin calyci adnatum, 1-loculare. Placentæ 2 parietales, vix oppositæ ! stipitatæ, subbifidæ, faciebus interioribus approximatis sterilibus. Ovula 00, campylitropa, nucleo primario prominulo, secundineo nullo ? Stylus brevis, filiformis crassus. Stigma capitata. Flos. partes tantum in alabastro unico juveni vidi.

Capsulæ, calyce ampliato-cinctæ, racemosim dispositæ, circumscissæ basin prope, parte reliqua, stylo stigmatique coronata, calyptra more placenta apicis tegenta.

Placentæ fungosæ. Semina minuta brunnea. Testa fibrosa brunnea. Tegument. interius celluloso-reticulat. Embryo orthotropus. Radicula crassa cellulosa. Cotyledones plano-convexiusculæ.

Obs. Is not the calyx adnate to the base of the capsule, if so, this is a reason for the Order not being distinct from Gesneriaceæ.

Hab. Assam. In umbrosis humidis collis humilis prope *Gubroo Purbut* : *March*, 1836.

Didymocarpus.

Didymocarpi sp. Pl. CCCCXXXVI.

Hab. Mishmee mts. The tube of the corolla is white tinged beneath with yellow, lamina purplish blue. Leaves dark-green frequently spotted with black.

Æschynanthus.

Æschynanthi sp. Pl. CCCCXXXII.

Fol. ovato-lonceolatis acuminatis coriaceis, venosis, venis secondariis subarcuatis. Cymus bipartitus terminalis bracteis ovatis sanguineo-coccineis. Pedicellis calycis sepalis lineari-lanceolatis amplis, tubo partem rectam æquantibus corollisque superne curvatis pulchre coccineis. Staminibus exsertis, subascendent.

Torus glandulosus cyathiformis, ovarium basin cingens. Ovar. lineare cylindraceum biloculare! spatho nempe inter placentas materia cellulosa, repleto cujus axis vasculosa. Placentæ parum recurvæ.

Hab. Khasyah mts. *Churra: Oct.* 11*th*, 1835. Variat. foliis angustatus.

Æschynanthi sp. Pl. CCCCXLI.

Parasitica in arbor. Caulibus scandent. articulatus, articulis tumidis.

Fol. oppositis, breviter petiolatis carnosis lanceolat. vel lineari-lanceolatis acuminatis, subdentatis, dentibus, purpurascent. subtus pulcherrime purpureo-pictis nervo medio atro-sanguineo, supra inconspicuo, floribus interdum solitariis, sæpius 2 ad apices ramulorum majusculis, pedicellis 4-gonis petiolis longiora purpurascent.

Cal. 5-sepalus, sepalis lanceolatis æqualibus acuminatis æstivatione imbricata subaperta. Cor. ringens subinfundibulif. deorsum curvata, tubo calycis longit. fauce ampliata compressa, limbo 5-fido, laciniis rotundatis, 2 superior minoribus.

Stam. longissime exserta et extrorsum torta fauce inserta. Rud. 5-ti centrale, filamenta subulata glanduloso-pilosa. Connectivum carnosum tubus intus pilosus, pilis subulatis articulatis, articulis basin versus majoribus, cellulis

terminalibus purpureis, summis, strangulatis, multa angustioribus mucronulif.

Anth. subadnatæ, (basibus affixæ ?) biloculari. Pollen ovat. læve hinc sulcatum apice repandis.

Discus hypogynus cyathiform. ovar. basin cingens.

Stylus subclavatus glanduloso-pilosis longissime exsertus deorsum spectans. Stigma peltata integra, medio transverse foveolata rubra.

Lobis corollæ ciliatis, æstivat. imbricat. lobis 2 lateral exteriorib. 2 superior intermediis, inferiore intimo.

Ovarium (per juvene) 4 loculare breviter stipitat. placentis pseudo parietalibus nempe extrorsim productis parietibusque ovarii adnatis, ovulis plurimis, transversis, radicula hilum prope. Capsula utrinque subulata (immatura) longissime stipit. basi toro cyathiforme cincto, viridis maculis purpureis, 4-locularis.

Hab. In arborib. Mergue ubique,

The structure of the fruit is evidently as follows.

It is formed of 2 carpellary leaves, the placentæ of which meet in the centre, and are reflexed outwards, along the parietes of the ovarium, to which likewise they adhere. They only bear ovules when free. It is 4 celled, because the axis and spaces between the plates are filled up with cellular tissue.

Anth. primo perparia apicibus tantum cohærentes, demum distantes. Cor. carnosa, tubo luteo-viridi, superne *brown-pink*, limbi lobis, fusco-luteis, sanguineo notatis, sepalis brunneo-viridescent.

Pericarp. immaturum didymum, vel profunde emarginat. e carpellis 2 verrucoso-areolatis oblique ascendentibus constans, ovula ascendentia angulo superior loculorum affixa, sed ob directionem loculo nec pendula.

Hab. Mergue. In sylvis humidis Madamaca: *Nov.* 1834.

Slackia.

Slackiæ sp., Pl. CCCCXXXIII.

Stam. 4 cum rudimento quintus. Stigma subsimplex! potius subcapitatum.

Ovar. sub 4 gonum purpureo-maculatum. Cor. alba, stam. ochroleuca.

Legi in collibus Nagensibus prope Nam tuwa, alt. 3500 ped. in ripis umbrosis. Vix occurrit infra alt. 3000 pedum. Si novum genus Slackia nominandum.

Hab. Delvi Nempea, journey from Assam to Ava. *March* 20*th*, 1837.

Cyrthandraceæ, sp. *(grandiflora,)* Pl. CCCCXXXIV.

Planta carnosa in humidissima proveniens et vix infra alt. 4000 3500 pedum.

Radices promiscue e caule, fuscescentes. Pet. et pubescentia læte viridescens.

Fol. subtus alba, venatio excepta qua læte viridis supra saturate viridia, venatio v. secondariæ prominulæ præsertim subtus tertiariæ subtus conspicuæ, mutuo anastomosantes, v. additoriæ conspicuæ.

Pedunculi pallidi. Bracteæ viridescentes. Calyx albidus vel sanguineo-purp. maculat. Cor. maxima $2\frac{1}{2}$ uncialis, extus pubescens, tubo fere albido, lamina, pulcherrime cyanea : lineæ luteæ binæ latæ subconfluentes ad basin lab. inferioris.

Hujus generis est planta Mishmeensis, e Deeling.

———Grandiflora.

Journey from Assam to Ava. *Delvi Khussee Khyoung*: *March* 15*th*, 1837.

Cyrthandiacea sp. Pl. CCCCXXXV.

Herba spithamæa pedalisve, floribus albis corolla rotata, foliis rugosis hispidis, caule rubescente hispidissimo.

Journey from Assam to Ava. Versus Magoung fluvium, in sylvis umbrosis, *April*, 1837.

Cyrthandiaceæ, sp. Pl. CCCCXXIX. Fig. 2.

Epiphytica in Gordonia, altitudine 3300 pedum.
Caules fasciculati arcte adhærentes.
Cortex cinereo-albidus.

Fol. opposita approximata: inferiora rotundata patentiore superiora ascendentia lanceolata, acuta, carnosa pennivenia utrinque punctata, subtus albida viridia, supra lutescenti-viridia.

Alabastro viridescent.

Inflorescentia composita, floribus super primo evolutis.

Bracteæ minutissimæ subternæ cuique flori, centralis tantum florifera, acumina brunneis setaceis.

Calyx pubescens uti pedicellus.

Corolla ringent infundibuliformis, extus pubescens, tubo deorsum curvato, labio superiore bifido, fornicatio, inferiore 3-lobo, lobis lateralibus porrectis vel subreflexis, medio reflexo, color tubi læte coccineus, vel potius miniatus, lab. superior purpureo-tinct. inferiore maculata punctis confluentibus fusco-sanguineis.

Stamina longe exserta (filam sup. breviora) fusco-purpurea pubescentia. Anth. biloculares perparia apicibus punctæ et intus geniculato-flexa. Connect. carinoso purpureo fusco. Anth. atrato-purpureæ. Staminum quintum minimum. Discus hypogynus circularis lutescens.

Ovar. subcylindraceum. Stylus filiformis fusco-tinctus, Stigma capitati-papillosum fere semper destruct. cum stylo.

Obs. Scrophularineæ distinguuntur alia notu, vix absentia staminis quintus.

Inflorescentæ partiales vero compositæ monente *bracteārum præsentia*, verisimilites dichotome ut in Acanthaceis omnibus.

Hæc planta adest etiam in collibus Mishmeensibus.
Journey from Assam to Ava. Yoomsam : *Feb. 27th*, 1837.

Cyrtandraceæ sp., Pl. CCCCXXIX. Fig. I.

Epiphytica et pendula exarboribus, fol. supra evenia subtus univenia et pallida.

Caulis ute pubescentia ferruginea. Cor. ringens tubo mediocri, fauce constricta coccineo-miniata, lamina intus sanguinea. Anth perparia cohærentes, antice lividæ postice atratæ. Filam. albida ut stylus et stigma.

Cyrtandraceæ sp. Pl. CCCCXXXIX.

Itinerary notes p. 25, *no.* 388.

Hab. Khasyah mts.

Cyrtandraceæ sp. Pl. CCCCXXX.

Itinerary notes p. 105, *no.* 80*a*.

Hab. Bootan.

Cyrtandraceæ sp.—picta, Pl. CCCCXXXI.

Itinerary Notes p. 43, no. 677.

Hab. Khasyah mountains.

BIGNONIACEÆ.

Bignonia.

Bignonia adenophylla.

Arbuscula cortice cinereo-spongiosa molle, ramulis obtuse 4 gonis, pedunculis petiolis foliisque ferrugineo-tomentosis, fol. inpari-pinnatis 3-jugis, summis tantum 2-jugis, foliolis difformibus, pari inferiore cordatis cæteris ovuto-oblongis, terminali petiolato, juniori lateralibus minore, seniore multo majore, repandis breviter acuminatis, lateralibus sessilibus. Cymis paniculatis, terminalibus multifloris dichotomis. Bracteis ferrugineo tomentosis ovatis calycibus densissime ferrugineo-pilosis. Cor. extus tomento ferrugineo pallido, ochroleuca majore.

Cal. campanulatis bilabiatis, lab. super 2-dentat. inf. 3 fido, laciniis æqualib. Cor. campanulata subleathery, limbo bilabiatim $\frac{2}{3}$ partito tubo basin supra constricta vel tubi basi ampliata.

Stam. didynama, parte constricta tubo inserta, declinat. Filam. subulata. Anth. ad apicem filamenti affixæ bilocular loculis post dehiscentes divaricatis. Rud. 5to inter lobos labii superior subulat.

Stylus filiformis, stigma bilamellat.

Ovarium extus, ferrugineo-pilosum in discum peltatum circulare insidens, biloculare, loculis multi ovulatis placentis incrassatis ad axin angustatis, foramen hilum versus.

Capsula immatura siliquæformis cylindrico-subulata, leviter torta, extus lineis pluribus elevatis, ferrugineo-tomentosa glandulis foveolatis interspersis basi calycis persistente stipatum, bilocularis, polysperma. The placentæ are right and left with respect to the axis. Semina matura nondum vidi.

Hab. Mergue in sylvis et circa tecta etiam Moulmein in sylvis. Flores per totum annuum. *No.* 465.

Bignonia suberosa. Roxb.

Arborea 30 pedalis, fol. bipinnatis, pinnulis oppositis inferior 2-jugis cum impari, superiore summo intermedio 1-jugo cum impari (an pars folia terminalis ?) fol. ovata acuminata basi obliqua, integra dentatave, subtus ad nervos pubescent. et glandulis interspersa.

Paniculis terminalibus cymosis, cymis divaricatissimis. Pedunculis basi tumidis bracteatisque, floribus magnis albis carneo-tinctis suavissime odoratis.

Cal. tubo brevi campanulata, 5-dentata, dentibus brevibus revolutis.

Cor. hypocrateriform subbilabiata, tubo longissimo cylindrico, $3\frac{1}{2}$ unciali, lab. super. ascendens bipartit. inf. 3-lobum, lobis lanceolatis, corollæ laminam intus velutino-tomentosa, æstivat. subvalvat.

Stam. 4, didynama fauci inserta, lab. superior approximat. Rud. quint. minimum setiforme, filam. filiformia lab. superiore breviore. Anth. 1-locularis, loculo altero minimo celluloso abortivo, lamina infera cujusque locul. basin versus processum subulat. gerens, longitud. dehiscente. Stylus filiform longissimus exsertus, stigma antico postice bilabiat.

Cupula glandulosa integra ovarii basin cingens.

Ovar. bilocul. placentis 2, parietalib. placentis nempe lamin. vertical. nec ovulifera conjuncta. Ovula 00 placentis transversis affixis, foramen hilum prope.

Hab. Mergue. This is also a common tree about Calcutta.

Millingtonia.

Millingtonia simplicifolia, Pl. CCCCXLII,

In this plant we have an irregular pentasepalous calyx, the outer sepal being the smaller and very similar to the bractea, a tripetalous corolla, each squamiferous in the centre, two fertile stamina and a cleft disc. surrounding the ovary, this disk being deficient at the point alternating with the two fertile stamina. There is thus a high degree irregularly existing in the conformation of the flowers of this genus, the calyx being the only exception, at least so far as regards its component parts. The corolla is to be explained evidently by the coalition of four petals into two, and this is demonstrated by the size and obliquity of the single one and (to a certain degree) by its venation in the compound ones, the line corresponding to the line of union is vascular.

This at once reduces the situation of the stamina to their proper places, viz. opposite the sepals, and this is further corroborated by the evidently lateral situation of that which is attached to the single and smaller petal, and which is one-celled by abortion.

We have however still to explain the relative site of the

parts composing the disk; the teeth of which as particularly pointed out by the single one are opposite the sepals. This can only be explained by the supposition, that the intermediate series is either altogether wanting or represented by the tooth like appendages of the scales.

This is most likely the true nature of these bodies, it is at once evident that such appendages are opposite to the compound petals, and further there is but one developed opposite the smaller petal. Of the nature of the bifid scales attached to the back of the fertile filaments, I am at a loss; are they analogous to the tooth-like processes, in which case they would belong to the sterile filaments, with which however they do not separate.

Granting the above teeth to represent the intermediate series, the male organs are normally situated, and ought to be 15.

The ovary is two celled, the cells are anticous and posticous. The above view is quite distinct from that entertained by Wight and Arnott, to which a greater degree of objection exists in the fact, that their bifid petals are opposite the innermost sepals, while they have no analogy either of structure or situation with the three orbicular petals.

I am not sufficiently acquainted with other genera of the order, to form an opinion of the true nature of the appendages of fertile stamina.

The views of the authors of the Prod. Fl. Pen. Ind. Orient. were it not for the opposition of the fertile filaments to the interior sepals, would square well with the alternation of the teeth of the disk, the single petal is anticous.

1. Alabastrum just before expansion.
1*a*. Ditto.
2, 3. Flowers.
4. Inner view of compound petal and its scale.
4*a*. Same to shew the venation.
5. Ditto, simple petal, its one-celled scale and one tooth.

5*a*. Ditto ditto.
6. Stamen outer view of.
6*a*. Inner ditto. 6*b*. lateral.
7. Pollen, opaque.
7*a*. Viewed in water.
8. Ovarium and calyx.
8*a*. Ditto calyx removed.
9. Ovarium.
9*a*. Ditto longitud. section.
9*b*. Transverse.
10. Ovula with portion of the filament, the filaments probably are connected with fecundation.
11. Partium situs et alternatio, this must be so modified as to make the single petal anticous; the three forming this angle with the axis.

Obs. It is not improbable that the Malyan Millingtoneæ are distinct from the India ones, at least from M. simplicifolia.

Dr. Jack's explanation of the structure of M. Sumatrana appears to me perfectly correct as regards the petals and staminia, the 3 large petals, being equilateral, equally veined; although rather unequal in size, and the two smaller being similarly central veined, and attached precisely to the bases of the fertile staminia, as the barren ones are to the larger petals.

With the Malyan plant, I only hesitate about the calyx, which I find to be 3-4 sepalled imbricately, the pedicels being 1, 2, bracteate, I see no difference in the venation of the sepals.

I would rest the distinction temporarily upon the fact of the æstivation of the large patals being nearly valvate, it is so along 2 of the 3 edges on the æquilaterality of the big petals, on the entireness of the smaller ones, or the want of auriculæ to the base of the barren anthers, and on the dehiscence of the anthers which is curious, and of the reflexed valve.

I have only examined imperfect specimens of the Malayan plant.

That any linear organ may have a mesial process, I think it is pointed out by the involucre of Hibisc. surattensis, in the earlier stages of which no trace exists of the subsequent well developed liguliform internal central process.

Which is in the calyx an analogus to what takes place in the corolla of certain Bytneriaceæ Guazuma etc.

This has the same simple development by points from a terminal discoid cellular mass.

The situation of the scale or appendage of either fertile filament is the reverse of that which takes place in the Simarubaceæ and Zygophylleæ, see Lindley Introd. Nat. Orders, p. 129, 133, hence if they represent portions of an additional series of stamina, in Millingtonia they would belong to the 1st, and in the two orders above cited to the third and fourth series, as in these two orders there is great probability that such is their present nature.

Granting their nature to be the same in Millingtonia and allowing the suppression of two petals, we shall have an attempt made at the development of four series of stamina, we must suppose the suppression of one intermediate series which should be opposite to the petals namely 4th. In this view the first series consists of two abortive stamina, the second of two abortive do. but more developed; the third of two fertile stamina opposite two sepals, 4th wanting, 5 opposite the sepals.

But this view does not explain the nature of the denticular scales, which seem to have escaped the notice of all authors who have written on this *group* or *genus*.

I am aware, that there is another mode of explaining the structure, which however does not take into account, the denticular bodies, to which from the fact, that it is single, attached to the smaller petal, I attach much importance by allowing the suppression of two petals, and the total suppression of the fourth series of stamina.

On the whole my view is liable to fewer exceptions, nor do I see any reason, why a filament should not become processiferous.

If they are stamina, then the 1st series is reduced to two, the 2nd is complete and represented by the denticular bodies, and the normal number hence will be 25, the third is complete, the 4th wanting, the 5th complete in number but not in function.

PEDALIACEÆ.

Sesamum.

Sesamum orientala.

Cal. subæqualiter et profunde 5-partit. persistens.

Cor. campanulata, tubo basi superne gibbo limbo subbilabiato crenulato lobo 1 tantum porrecto.

Stam didynama ad partem gibbum insert. filam subulat. inclusa. Anth. basibus affixæ, bilocul. longit. dehiscent.

Stylus filiformis inclusus, stigmata 3, acuta lineari-lanceolata. Discus hypogynus annuliformis, ovarium basin cingens.

Ovarium extus glanduloso hispid. 3-loculare interdum superne 6-loculare, septis 3, multo magis tenuibus forsan spuriis e nervo dorsali folior. carpellorum completis incompletisve ortis.

Ovulis plurimis 1-serialibus, si septa 6, 2; si 3, transversis vel ascendentibus, foramen hilum prope.

Sem. obovata tegumento duplici. *albumine parco carnoso oleaso.* Radicula brevis subulata hilo versa, cotyledones planæ, plumula inconspicua.

Dehiscentia loculicida. Herbacea viscosa pubescens.

Foliis lanceolato-linearibus subintegris, acutis floribus albis maculis rubris, aspectu Digitalis, axillaribus breviter pedicellatis, solitariis. Bracteis setaceis 2 ad basin pedicellorum, fructibus pubescent. erectis, obtuse 3-gonis.

Obs. Jussieu's explanation of the additional cells being formed from the inflexion of the middle nerve is certainly applicable to Sesamum.

Hab. Culta circa Mergue ob oleum. *No.* 474.

Martynia.

Martynia diandra.

Flos. suffultus bracteis 2 ovato-oblongis subpetaloideis subascendentibus.

Sepal. 5, lineari-lanceolata, 2 inferiora majora, 3 superiora, quorum intermedia intima duplo fere minora.

Cor. infundibuliformi-bilabiata tubo basin versus gracile, fauce ventricoso. Lamina 5-loba, lobis rotundalis 2 superioribus (æstivatione exterior) minorib. quinto et antico majore.

Stam. 5, inclusa, 3 superiora sterilia summo minimo, 2 inferiora fertilia. Anth. loculi divaricatissimi paralleli, perparia contigue.

Pollen album globosum glabrum.

Stylus filiformis basi subulat. Stigma bilamellat lamella inferiore majore.

Ovar. globosum toro ipsius formam mentiente insidens biloculare, pseudo-4 loculares ob placenta contiguam loculis pariete exteriori ovarii. Placentæ separabiles omnino ut in Verbenaceis quibusdam (et Cyrtandraceis) bivolutatæ, ovulis pendulis, foramen hilum prope. Fig. II. Pl. CCCCXLII.

Fructus penduli ovato-cymbiformes, apice conico incurvato, stylo marcesco apiculat. bilocul. pseudo 4-loculares. Drupacea endocarpio carpio osseo.

Semina pendula. Testa laxa mucilaginosa cellulosa exalbuminosa membrana interna tenuissima embryonem vestiens.

Embryo radicula obtuse supera. Cotyled. planiusculæ basin versus 3-nerviæ. Plumula inconspicua.

Hab. Bengal Serampore: *Augt.* 20*th*, 1837.

Obs. Inflorescentia racemosa, an subpaniculata, bracteâ inflorescenteæ ramulum suffultiens, petiolat. petaloid.

Genus, flore ovulisque Gesnerecaceis. Sect Cyrthandraceis accidente. ovario, placentatione, et fructu Verbenaceis.

Folia opposita, Clerodendraceæ.

LENTIBULACEÆ.

Utricularia.

Utricularia albiflora, Gr.

Aphylla spithamæa, caulibus simplicibus filiformibus, squamigeris, floribus racemosis albis, labio inferiore macula lutea. Racemis terminalibus paucifloris. Pedicellis basi 3-bracteatis calcare conico-acuta, lab. inferiore paulum longiore.

Hab. In aquosis arenosis. Mergue: *July*, 1834.

Utricularia lilacina.

Aphylla, l spithamæa radicib.? fibrosis, caule terete apicem versus angulato squamigero. Racemo terminali paucifloro, floribus distantib. lilacino-cæruleis, lab. infer. macula lutea, macula lineis 5 cæruleis notata, lab. sup. basin versus lineis 4 cæruleis, sepalis æqualibus acutis, lab. super. emarginato, infer medio elevato subintegro, calcare conico subulato longit. labii inferior. Pedunculis fructiferis erectis.

Hab. In aquosis Kulweng. Mergue: *Aug.* 1834.

VERBENACEÆ.

Verbenaceæ Malayanæ.

Cor. infundibuliform, æqualiter 4-partita.
Stam. 4 fauci angustati in annula inserta, vix exserta.
Stylus conicus stigma bifidum non exsertum.

Clerodendrum.

1. *Clerodendrum viscosum.*

Suffruticosa 4-pedalis, pubescenti-pilosa, foliis cordatis, acuminatis, distanter serratis serraturis mucronatis. Paniculis amplis terminalibus cymosis, dichotomis. Calycis sepalis, foliaceis, ovatis subæqualib. Cor. tubo calyce paulo brevior, pubescentia purpurea, limbo 5-partito laciniis extus pubescent seorsum inclinatis. Stam. longissim. Anth. atro-purpurea.

Floribus suaviter odoratis.

In ruderatis Mergue: *Mergue Herb. no.* 677. *Nov.* 1834. In iisdem lacinis Moulmein copiosa.

Ovarium typum Cyrthandraceum, evolutione sequitur carpella antica posticaque. Fig. 20, Pl. CCCCLVIII.

2. *Clerodendrum splendidum.*

Erectum basin suffruticosum caulibus 4-angularibus, profunde 4-sulcatis angulis rotundatis.

Fol. longissime petiolatis palmative 5-lobis, basi profunde cordatis, lobis acutis terminali maximo subcrenato repandis. Petiolis ad articulos tumidis. Pilis ciliatis inter petiolos.

Inflorescentia, terminalis cymoso-paniculata, cymis infernis foliis floralibus suffultis, superioris bracteis foliaceis petiolatis, spathulatis ovatis, petiolis nempe coccineis, ut tota fere inflorescentia. Cymis dichotomis, inferior longioribus adeoque inflorescentia pyramidalem fit. Pedunculis pedicellisque calycibus, corollarum tubis et genilatibus coccineo aurantiaceis, limbo corollæ ochroleuco-carneum, fauce majis coccinea. Staminibus sæpius arcte deflexis interdum declinatis? Stylo deflexo.

Species pulche rima. Nomen aptum, quamvis characterem ejus nescio. Ut Tavoy circa crescit hanc plantam C. splendidum Wall. esse haud dubito.

Hab. In ruderatis circa Mergue, *July*, *August*, 1834. *Mergue Herb.* 78.

3. *Clerodendrum densiflorum.*

Basi suffruticosa, erecta ramosa 4, 5 pedalis. Foliis longe petiolatis infernis cordatis acuminatis subintegris basi 3-nervus, nervo medio ad basin utrinque 1-glanduloso (glandulo e 4 confertis callosis composito) sublente utrinque punctulat. subtus ad nervos tenuissime velutinis.

Cymis axillaribus terminalibusque aggregatis corymbum densiflorem mentientibus, floribus albis. Cor. tubus rectus longissimus in laciniarum marginibus revolutis staminibus longiss. exsertis, stylum longe superant. Anth. cæruleo livide. Cal. glandulosis fructifer amplectus, ruber subcarnosusque.

Capsula atro-cærulea, baccata 4 sperma. Sem. nigrescentia angulato. Albumine 0. Radicula brevis infera.

Hab. Frequent Mergui in Ruderat. florem, *July* to *Nov.* ***Mergue Herb. 79.***

4. *Clerodendrum affine.*

Frutex 8-10 pedalis, subsimplex, caulibus sub 4-gonis adpressa pubescent. Fol. cordatis acuminatis subintegris tactu mollibus. Paniculis terminalibus subpyramidatis thyrsoideis bracteatis, bracteis foliaceis, lutescent, floribus parvis albis fauce rubescente laciniis subascendentibus. Stam. longissime. Anth. atro-purpureæ.

Hab. In aquosis intra Kulweng et Mergue: *Dec.* 1834. C. viscoso valde affine. Typus formationes carpelli Cyrtandraceus.

5. *Clerodendri* sp.

Cal. tubo subcylindraceo, limbo erecto 5-dentato.

Cor. hypocraterif. tubo longo gracilis laciniæ æqualiter? patentis 5to majore et *profundiore* (æstivatione) extimo.

Stam. didynama longe exserta, æstiv. introflexa, (2 inferior longior.) Anth. oblongæ sinu affixæ, biloculi, longit. dehiscent.

Stylus filiformis exsertus. Stigma bifid. acutum (that is the style) is bifid, but the stigmatic surfaces are prolonged beyond them into 2 acute points, (Fig. IV. Pl. CCCCXLVIII.) stigma rather the biggest.

Stigmatic canal with long cells of exceeding fine tubes containing large granules, generally of the diameter of the tube.

Ovula 4 appensa. Ovar. 1-celled (the placentæ not united) in the axis, placentation as usual.

Fructus with as many lobes or furrows as pyrenæ basi calyce varie fisso cinctis baccatus 4 pyrenaceus. Pyrenæ formed by endocarp. 4-locularis. ?

Seeds 1, 4, often abortive appensed. Tegument cellulo-membranous.

Hab. Malacca. Cotyledons, plano-convexiuscule radicle inferior.

6. *Clerodendri* sp. Pl. CCCCXLV.

Calyx 5-partitus amplus, demum carnosus ampliatus.
Cor. Unilabiata hypocraterif.
Stamina deorsum curvata longe exserta. Anth. sagittato-ovatæ, bilocul. longit dehisc. Pollen purpurasc.
Stylus arcte sursum curvatus vel declinatissimus.
Stigmata 2, setacea.
Ov. 1-loculare. Placentis revolutis, biovulatis ovulis pendulis, appensis.
Fructus calyce ampliato cinctus.
Infloresc. dichotoma. Pedicelli clavati apicem infra articulati! Æstivatio discrepans from other Verbenaceæ, lobo dextro, (dorso spectans) lab. superior omnino interiore.

1. Alabast.
2. Expanded flower.
3. Corolla laid open.
4. Corolla before expansion, laciniæ cut away to shew the packing of the genitalia.

5. Anther back view.
6. Ditto front.
7. Ditto after debiscence.
8. Back view of do.
9. Pollen in water.
10. Ditto after rupture which soon takes place.
11. Ovary transverse section of.
12. Ditto long section parallel to the carpella.
13. Pistilum, sepals cut away, style generally ascending.
14. Base of style.
15. Stigmata.
16. Placenta extracted with the ovule somewhat bent back to shew their insertion.
17. Pistillum after fecundation back of a carpellum laid open, shewing the situation of the ovula.
18. Ovulum before fecundation no distinction of coats.
19. Ovule after fecund, *a* testa and nucleus combined; *b*, embryonary sac globular above, in toto clavato, *c* hilum.
20. Ovule more advanced, *d* embryo. The embryonary sac is generally bilobed at the apex, here it is membranous but not so much as at its globular base, the bilobed apex does not become filled with cellular tissue.
21, 22. Embryonary sacs shewing the bilobed apex ! and membranous and membrano-cellular nature.
23. Ovary and base of style.
23*a*. ovulum of do. some time after expansion of the flower, excavation of the embryonary sac already commenced.

Obs. The situation of the flowers in Volkameria is certainly reversed, neither can I yet tell what is the cause of this. The 5th petal being certainly next the axis. That the fissure by which the corolla is rendered unilabiate is carried thro' the 2 petals corresponding to the upper lip of other plants of the Order is proved, 1st by the æstivation and 2nd by the situation of the stamina.

There is certainly some difference between the æstivation

of this Order, and of Labiatæ, one lobe of the upper lip of Volkameria being altogether interal.

It must be remembered that under Vitex, Brown says that Hosta is allied to Vitex, but that is totally different from Cornutia which is very nearly allied to Ægiphila, but both these genera are included in Verbenaceæ by Bartling and Lindley.

Callicarpa.

Callicarpe lanata, R. Fl. Ind. 1, 391. Pl. CCCCXLVIII. Fig. II.

The genus is allied in placentation to Avicenia, Vitex, and the involucrate genera. This placentation is remarkable and is analogous to that of Cyrthandraceæ, but differs in bearing definite ovula.

The pollen appears to have only one furrow.

Flowers purple, odoriferous.

Æstivation involuta et alternatem conduplicata connec_tion partibus cæteus glandulosuis.

1. Alabastrum.
2. Flower, usually tetramerous.
3. Corolla laid open.
4. Anther posteriorly.
5. Ditto anteriorly.
6. Pollen opaque.
7. Ditto in water (iterum examinandum.)
8. Calyx and Pistillum.
9. Pistillum.
10. Ovary transverse section.
11. Ovary long section between the carpella.
12. Ditto exterior of a corpellum laid open.

12*a*. Ovule and portion of Placenta.

13. Fasciculate and ramous pubsescence, the former being a contraction of the latter.
14. Æstivation of corolla.

Bamo. April 30th, 1837.

Premna.

Premnæ sp.

Cal. brevis tubo obconico, dentibus 4 rotundatis.

Cor. bilabiat. (tubo cylindraceo) laciniæ 3 subæquales, 4th antica (or posticous segment of 2? central vein smaller and shortest not so in others,) majore porrecta upper segment entire or bifid, outermost in æstivation.

Stam. didynama, fauci inserta, Anth. breviter exsert. subreniformes sinu affixæ, rima longitudine vix *complete* dehiscent.

Stylus filiformis bifidus, lacinia intus stigmatos revolutis.

Ovarium biloculare, the parietes produced inwards, as far as the placentæ. Ovula cuique loculo 2, pendula.

Inflorescente terminatis corymbasi.

Hab. Malacca.

Congea.

Congea vestita, Gr. Pl. CCCCLVIII. Fig. 21.

Scandens, fruticosa, ramis teretibus petiolis foliis utrinque paniculisque pilis pallide ferrugineis hispidissimis, foliis ovato-oblongis breve petiolatis, acutis subintegris tactu scabris.

Paniculis terminalibus et in axillis foliorum summorum floribus capitulato-umbellatis, umbellis longius pedunculatis, infimis ex axillis foliorum alternis conformum sed minorum, superis ex axillis folior floralium cordato-ovutis mucronatis, sericeo-niveis.

Capitulor. involucris 3-phyllis, foliis ovatis, venoso-reticulatis obtusis, subtus concavis, niveo-sericeis, umbellis 5-7 floris.

Pedicellis brevibus, calycibus pilis sericeis longis hispidissimis.

Cor. parviuscula ex albo-rosacea, brunneo striato præsertim lab. superius.

Cal. subinfundibulif. 5 fidus laciniis ovatis erectis, apiculatis æstivatione valvatis, fauce inflata, cor. tubo filiforme cylindrico calyce paulo superante deorsum curvat. limbo bilabiat 5-fida porrecto, lab. super 2-fido, inferior 3-fido, laciniis reflexis faux intus pilosa.

Stam. 4-didynama longissima exserta, flexuosa filam filiforme hinc inde substrangulat. fusco-purpurascent. Anth. terminalæs bilocul. atro-brunneæ, subversital. loculis medium versus et secus marginem superior dehiscent. Pollen pallide ochroleuco miniat. læve lanceolat. hinc sulcat.

Stylus longissimus flexuosus fusco-purpurascens. Stigma subsimplex.

Ovarium apice glandulosum 2-loculare, obsolete 4-loculare, placentis nempe extrorsum inter ovula productis et parietes capsulæ fere attingentis, sed nec adnatæ, loculis 2-ovulatis, ovulis pendulis, dissepimento spurio disjunctis.

Ovar. ideo e typo Cyrthandraceo efformat. ovulis apice membranaceis et foraminatis.

Æstivat. imbricato. lab. super. infer involvens, Char. Sprengelii erroneus ait gemum 4-loculare.

Hab. Mergue. *Mergue Herb.* 898.

Decadontia.

Decadontia cœrulescens.

Frutex scandens, ramulis 4-gonis hirtis. Fol. oppositis, oblongo lanceolat. acuminatis cum mucrona subintegra, subtus præsertim, ad nervos pubescent. Inflorescentia capitato-racemosa, racemis paniculat. Pedunculis 4-gonis, hirtis. Involucro 6-phylla subcapitulo quoque, foliolis lineari-spathulatis hirtis patentissimis capitulis danse subseptem floris, floribus fusco-ochroleucis, parviusculis, odoratissimis. Stam. cyanea.

Cal. infundibuliform pubescens, 5-dentat., dentibus ovatis acutis sinubus in processubus subulatis extrorsum productis, æstivat. valvat.

Cor. infundibulif. tubo calyce breviora, 5-partit. laciniis oblongis obtusis patentis æstivatione imbricatis, faux pilosa, pilis purpurascent.

Stam 5 faucei inserta libera laciniis corollinis alternant. longe exserta. Filam. subulata. Anth. versat. reniform-hippocrepidiformi biloculari, longitud. dehiscentes.

Pollen albidum oblongum hinc sulcat. 00, liberum dense pilosum, stylus filiformis, pallidissime cæruleus, stamina superans curvat.

Stigma bifidum.

Ovarium 2-loculare loculis incompleti spurieque bilocellatis placentis nempe extrorsum et inter ovula product. et parietes capsulæ attingentibus sed nec accretis, ovula 2 cuique loculo; ovula pendula ab apicibus placentam foramen infera ad apicem.

Hab. In sylvis, circa Mergue: *Jan.* 1835. Mergue Herb. *No.* 903.

Stam. 2 inferior longiore, super, breviore.

Congeæ valde affinis, ob habitu et structura placentam omnino similis, discrepans, calycis sinubus extrorsum productis. Cor. regular. Stam. 5, antheram forma et dehiscentia. Pili faucis repand. nec vere moniliformes, an Sphenodesma pentandra. Roscoea pentandra. Roxb. Icones.

Brachynema.

Brachynema ferruginea.

Frutex scandens ramis senioribus exceptis toto breve ferrugineo tomentosa. Fol. oppositis breve petiolatis ovuli-oblongis, breve acuminatis, integris subrepandis tactu submollibus, basi subcordatis. Inflorescentia capitultata, capitulis racemosis 7-floris, racemis axillaribus terminalibus, folia excedent.

Capitulis involucro 6-phylla cinctis, foliolus spathulato-ovatis in petiolis attenuatis, patentibus.

Cal. tubolosus bilabiat. labio utroque integro.

Cor. hypocraterif. tubo calycis longitudine faux pilis clausa,

laciniis 5 linearibus acutis pubescentibus patentibus æstivatione imbricatis, tubo intus villosissimo.

Stam. 5, medio tubo inserta, libera, laciniis corollinis alternant. inæqualia, 2 longiora, 2 breviora 1 centrali intimeo filam. brevia.

Anth. ovatæ bilocul. longit. dehiscentes, inclusæ. Pollen oblongum læve hinc sulcatum.

Stylus brevissimus, stigma bilobum, subcapitat.

Ovar. ferrugineo-pilosum, biloculare, loculis 2-ovulatis, ovulis pendulis ab apice placentæ, foramen ad apicem inferum.

Hab. In sylvis Mergue: *Jan.* 1835. *No.* 938.

Decadontiæ proximum, sed calyce bilabiat. Cor. hypocraterif. fauceque villosa, Staminibus inclusis, antheris connectivo sub o, per totam longitud. dehiscent. Stylo sub o, valde distinct.

Placentæ intra ovulam nec product. Dixi ob filam. brevia, in Congeæ, Decadontiaque longe exserta.

Peronema.

Peronema canescens.

Arbor. Fol. oppositis impari-pinnatis, foliolis lanceolatis vel oblongo-lanceolatis caudato-acuminatis, integris concavis subtus albidis, alternis vel suboppositis. Petiolis supra planus utrinque conspicue alatus, alis occupying whole spaces between the leaves, not truly decurrent.

Panicula terminalis ampla, e cymis partialibus in corymbos secondaria disposit. pubescens, terminalis, Tectona formis.

Flores minuti albi.

Calyx tubus campanulat. ad medium 5-partit. laciniis patulis, demum immulatis, 2 infimis paullo majoribus.

Cor. extus pubescens tubo subinfundibulif. calyce parum longior, bilabiata, laciniæ 4 superiores calycinæ subæquales, antico quinto longior duplo porrecto petaloideo.

Stam. 2, filam. robusta subulata æstivat. introflexa.

Anth. magnæ biloculares, reniformi-oblongæ, sinu affixa longitud. dehiscent.

The two lower ones are developed. Stam. superiora 2, ad rudim. filam. reducta.

Stylus filiformis basi et intus pilosus, stigma subsimplex subulata, subulo refracto.

Ovarium rotundato-cordatum, apicem dense pilosum, bilocu-lare, loculis more solito biovulatis, ovula enclosed in partial cells from recurved placenta, ovula pendual.

Section of Ovary. Fig. III. Pl. CCCCXLVIII.

Hab. Malacca.

Obs. As the ovarium increases the calyx is forced to spread out, it is now pubescent, in all the exposed part marked by 4 lines converging to the cicatrix of the style and simulating well a Boragineous fruit. The placentæ have become fleshy, and the proper cells of the ovula, quite complete (except adhe-sion.)

This is evidently the Peronema canescens of Jack, who describes the ovary as 4-celled, and the ovules as erect, in which case a greater degree of affinity with Teetona would be manifested; he also describes the wing of the petiole as decurrent, *i. e.* derived from the leaflets.

The inflorescence and aspect of the young fruit, is exactly that of Tectona, so is the appearance of the under surface of the leaves, although these perhaps are not siliceous. It osculates directly between the Vitex section and Tectona do.

Vitex.

Vitex gamosepala.

Arbor. mediocris.

Fol. trifoliata, foliolis lanceolatis acuminatis venatio apocyneoid.

Cymis axillaribus foliis multo brevior.

Cal. tubo brevi bilabiat. labio super majore integro inferiore bipartito extus.

Cor. tubo anguste infundibulif. glandulosus calyce fere duplo longior. bilabiat., labio super. bifido erecto reflexo infer. 3-lobo, annulus pilorum ad medium tubi. Stam. 4 vix didynama, filam. subulatis robustis basi pubescent.

Stylus longitud. stamin., stigma bifidum subæqual.

Anth. biloculares narrow horse-shoe-shaped, filam. inserti in sinus. Cells not quite all along the inner margins of the curve, so that the anthers are mucronate at the base. See Fig. II. Pl. CCCCXLVIII.

Cor. extus glandulosa, in æstivat. the upper lip is outermost, lower lip middle lobe innermost.

Hab. Malacca at Ching Rhingull.

Obs. The upper lip of the calyx which is glandular outside, is made up of 3, it often presents faint obsolete traces of composition, sometimes decided. The venation is too irregular to decide the point.

In this respect it differs from Vitex, but not always unless indeed the anthers and stigma or fruit present corresponding differences.

Gmelina.

Gmelina arborea, Pl. CCCCXLIII.

Arbor mediocris ligno duro.
Flores ante folia evoluti. Inflorescentia vero dichotoma.
Ramuli sub 4-goni maculis albis.
Upper Burmah Nulloboom. March 27th, 1837.

2. *Gmelinæ* sp.

Frutex vel arbuscula, ramulis foliisque subtus cano-tomentosis.

Spinis divaricatis axillar. (pedunculis efformatis) armat.

Fol. oppos. suboppositisve. ovatis vel obovatis, subdistichis.

Paniculis racemiform. interd. racemi axillaribus tenuibus, folia subæquant.

Flores cernui majusculi lutei subsecundi. Bracteus foliaceus lanceolati-deciduus.

Cal. infundibuliformis, ore obseleti 4-dentato.

Cor. infundibul. bilabiata (ringens) tubo calyce duplo longiore, angusto, fauce ampliata, lamina 4-loba, lobis 3 subæqual. latis reflexis, 4 antica multo majore porrecto. Æstivation, the upper or central lobe of upper lip outermost, lower innermost.

Stam. 4 didynama fauce inserta, pari infero duplo major. Filam. deorsum curvatum, connectiv. carnos. horse-shoe-shaped. Cells linear occupying the border of the flat side, attachment in the sinus.

Stylus subulatus rather longer than the longer stamina, similarly curved. Stigma bifid. lacinia infera, duplo major.

Style articulated on the top of the ovary. Ovarium 4-loculare, placenta sepalisque cruciate, ovula pendula.

Ovarium ut videtur interdum biloculare, ovulis 1-cuique loculo, in this case all the cells are opposite and only one stigmatic lobe, and 1 vasc. fascicle to the style.

Fructus, basi calyce spathacea fisso, circumcinct. subrotundus, basi subobliquis luteis. Sarcocarp. crassum, baccatum; odore peculiar ingrati. Pyrena 1, ossea obovata, thick exceedingly hard, 4-locularis, loculis 2-3 effætis.

Sem. pendula tegument tenue brunneo, albumen 0. Cotyledones plano-convexæ, radicula infera brevissime.

Hab. In thickets, Malacca in flower all the year.

Cal. infundibulif. 4 dentato.

Cor. infundib. bilabiat. labio super, 3-lobo, (reflexo) infer integro porrecto.

Stam. 4, didynama, connectiv. hippocrepidif. Ovar. 4-locul. 4-ovulat. ovula pendulis. Stigma bifidum excavata. Drupe, pyrena 1-4 loculare, 1-3 sperma, loculis 2-3 effætis. Sem. pendula, exalbuminos,

It is of the same ovarial structure as Tectona.

Obs. I do not like the subdivisions of Bartling as given in

Lindley's Nat. Orders. Verbeneæ is perhaps natural, but the involucrate genera, of which at least three genera exist, will form a very distinct section. Attention must be paid to the inflorescence which in many is truly dichotomous.

Gmelina cannot be associated with Vitex etc. on account of its unlobed fruit.

Augst. St. Hilaire is quite wrong in his assertion as to all except Avicennia having erect ovula. Brown on the contray is quite right.

In this order the 5th stamen never ? occurs in a rudimentary state, although it often does in its perfect state. This affords a diagnosis between it, add Bignoniacea, which otherwise might (*while in flower*) be confounded, that is, if the ovary be not examined. This is highly curious ; because from the tendency towards dichotomy that exists one would have imagined that the 5th stamen would be more developed than any of the others.

In all Verbenaceæ the foramen is very indistinct, in the present genus even at a very early period and when the corolla about equals the calyx, there is no trace of any integuments, and just before expansion, it has the same appearance of a simple fleshy body.

Sphenodesma.

1. *Sphenodesma pentandra.* Gr.

Frutex scandens, oblongo-lanceolatis acuminatis, supra lucidis glabris, $2\frac{1}{2}$ inches long.

Floralibus pallidis subalbidis multo minoribus.

Capitulis axillaribus, pedunculatis, 6-bracteatis, bracteis involucris in modo dispositis lineari-spathulatis obtusis, albidis reticulatim venosis.

Flores 7 cuique capitulo, 6 ex axillaribus bracteari-involucrive, septimo centrali, terminali nudo.

Cal. subinfundibulif. submembranacea, ore 5-dentato, sinubus, denticulis totidem auctis extrorsum quasi plicatis.

Cor. calyce $\frac{1}{3}$ longior infundibulif. subregularis laciniis 5, patente reflexa fauce villosissima colore plumbeo-viridis, faucis barbæ azurei.

Stam. 5 exserta 2 exteriora (inferiore) paullo longiora. Filam. subulata alba.

Anth. ambitu subtrigonæ crescentiformi, medio versus affixam. Connect. carnos. cellulos. papillos., loculis divaricantibus *adnatis.* Stylus stamina subæquans, teretiuscule lilacinus glaber apice bifidus ramis oblique truncatis apice stigmatosis.

Ovarium dense hispidum pilis pallide ferrugineis 2-loculare.

Placenta centralis thickened ex hujus apicem discoideo-ovula 4 nucleariform pendula, an extrant angle on either side divides the ovula of each cell from each other, and as this reaches the wall of the cell, the ovary becomes in a sense, 4-locular.

Hab. Malacca: *June* 1842.

Obs. An elegant shrub hair of faux stupose and fragrance very pleasant, upper 2 laciniæ of corol. are outermost, 5th innermost, that of calyx open.

Each branch of the style has its own canal.

It is more Verbenaceous in its pistillum than in any other part.

Considerable time elapses between the expansion of all the flowers, the central one is most precocious.

2. *Sphenodesma triflora.* Gr.

Ramuli ferrugineo-lepidoti.

Folia ovato-lanceolata quasi pendula, obtusa, glabra, coriaciuscula integra, venis 2 durus paucissimis arcuatim nexis, interveniis inconspicue areolatis. Paniculis axillaribus et terminalibus, altogether ample, ramulis (ultimis) oppositis, 3-floris, flora centrali nudo præcociore, laterali 3-bracteatis, bracteis lineari-spathulatis, calycem excedent. centrali majore, inflorescentia grisea, fl. parvi sanguineo-purpur.

Calyx infundibuliform leviter 10-striatus griseus, 5-dentibus erectis.

Cor. infundib. tubo calycis longitudine, 5-partita laciniis reflexo-patent. subcordatis with a slight disposition to $\frac{2}{3}$ labiation, line of coloration abrupt along the faux.

Stam. 5 alternant. fauci inserta, filam. atropurpureis, subulatis erectis, 2 superior vel posticis paullo brevior, Anth. longe exsertæ oblongæ, basi bilobæ, sinu affixæ, biloculari, longit. dehiscentes.

Stylus albus staminibus $\frac{1}{3}$ longior declinatus. Stigma bifidum acutum. Annulus pilorum tenuis ad insertion. filamentor.

Ovarium oblongum glabrum apicem parce glandulosum biloculare, loculis 2-ovulatis, ovula pendula, divided from each other by a process of the placenta which reaches to the wall of the cell, where it is truncate. ovules reaching quite to the fundus.

Pollen ovato-oblongum glabrum, 1-3 plicatum. Ovary with the base surrounded inside by a series of erect calycine hairs.

Nothing can shew more clearly than these instances, that the ovarium in all is unilocular at the apex; the placenta, if its apex is alone considered, is really Santalaceous.

Although the involucre is generally small, yet the lower ones of some panicles here and there are as large as ordinarily happens, in all, the flowers are 3 only, and this is the only species in which there is no correspondence between the flowers and the involucrate leaves, those being to these in all others *equal plus one.*

The inflorescence in this species is freely cymose, the lateral flowers in each of the dichotomes being wanting, we may hence expect 1-flowered pluri-involucrate inflorescences.

Sphenodesma triflora. Cymis trifloris, floribus laterali tribracteatis.

Malayan name Aloor Gagah.

Hab. Malacca at Verupha.

Hemigymnia.

Tectona has rotate quite regular Cordia, or Ehretia-like flowers. The stamina are quite equal, and regularly exserted. The anthers are likewise equal, although of a form admitting of divarication of the cells.

The calyx, looks Verbenaceous in Campanula and regular, rather deeply 5-6 partite. The style is subulate has 2 vessels, and each branch with two brachiate branches at the apex, each terminated by a punctiform papillose stigma. The ovary is glandular, (orange) at the base, it is really 4-celled, each cell has one anatropous ascending ovule (or subappended,) they appear to be nucleary, and are furnished with a very short raphal vessel.

The æstivation of the calyx is imbricate, so is that of the corolla, 2 lacineæ being outermost, and 1-innermost. See right hand Fig. VI. Pl. CCCCXLVIII.

The calyx becomes completely enlarged and depressed, and incurved apex inflated, and the ovarium becomes round completely spongy, presenting a St. George's Cross in the centre, the two larger arms being utrinque 1-vascular, and is consequently the placental or true septa, the others are 1-vasc., so that it only differs from the others in having the dorsal septæ very complete. See Fig. VI. Pl. CCCCXLVII.

The young seeds are completely appense.

From Tectona, Hemigymnia differs in the ribbed calyx which becomes cupuliform in fruit with a crenate or denticulate margin, and only appears to ½ enclose the pericarp, the attenuated subulate apex of which projects long beyond it, it also differs in its infundibuliform corolla, contrasted with the rotate one of Tectona, though its calyx is infundibuliform, which is singular.

It also differs abundantly in its 4-partite style, with linear stigmata whereby it approaches nearer Cordia than Tectona.

I propose calling it from its half enclosed pericarp Hemi-

gymnia in contradistinction to the inclosed pericarp of Tectona.

The flowers at first sight are like those of Pemphis.

Calyx infundibuliformis, striatus, 5-dentatus. *Corollæ* tubus infundibuliformis; laciniæ 5 (angustæ, tubo duplo longiores.) *Stamina* 5 aqualia, inclusa. *Ovarium*, 4-loculare, 4 ovulatum: ovula solitaria, ascendentia. *Stylus* bifidus, rami profunde bipartiti, intus stigmatosi. *Fructus* (immaturus) drupaceus, rostrato-cuspidatus, calyce cupiliformi-semicinctus.

Arbor *mediocris;* partibus novellis pube ramosa tomentosis. Folia *opposita, cordata, vel cordato-rotundata.* Inflorescentia *terminalis, cymoso-corymbosa.* Flores *congesti, in apicibus pedicellorum brevium articulati, mediocres, albi?*

Habitus quodammodo Rottleræ, aspectus florum Lythrarii, Pemphidis si velis.

Hemigymnia Macleodii.*

Habitat: Sylvæ Jubbulpore vicinæ, plerumque cum Tectona consociata.

AVICENNIA.

The species of Avicennia appear to be in a very confused state in Botanical works.

Avicennia tomentosa.

Arbor. 20-30 pedalis. Ramis laxiusculis ramulorum internodiis incrassat.

Fol. oppositis exstipulatis breve petiolatis (petiolis basibus subconnatis, bases versus superne axillisque pilosis) lanceolatis utrinque attenuatis integris glaberrimis acutis, carnosis subtus albidis.

Spicis terminalibus paniculatis, oppositis, floribus basi 3-bracteat. decussata oppositis, parvis inconspicuis luteis.

* Calcutta Journ. Nat. Hist. vol. iii. p. 363.

Calyx 5 sepalus, sepalis ovatis obtusis bases versus carnosis piloso-pubescentibusque æstivatione imbricatis.

Cor. gamopetala infundibulif. carnosa, tubo calycis longitudine, limbo 4-partito laciniis ovatis patentibus, apicibus subdentatis æstivatione imbricatis.

Stam. 4 fauci inserta laciniis corollin. alternant. Filam. subulata. Anth. didymæ longit. dehiscent. subexsertæ, loculis adnatis compressis. Pollen album ovatum læve hinc sulcatum.

Ovar. liberum cylindrico-oblongum, apicem versus pilosum, pilis albis cellulosis.

Stylus crassus breviss. Stigmata 2 simplice acuto conniventia, ovar. 1-loculare septis 2, stigmatibus alternant. incompletis. Ovula 4, pendula ab apice placentæ centralis liberæ, foramen infer. ad apicem ovuli.

Hab. Inter Rhizophoreus secus littoram Madamaca alibique vulgata occurrit. *Mergue Herb.* 969.

An Verbenaceæ, cum placentæ ovulorum structura maxime accedit. fol. subtus lepidota, squamis sæpius 4 lobis, medio pilifer. Pilis articulatis articulis superior demum decidius? nec vere tomentosa. Cor. extus pubescens.

Avicennia tomentosa, ovar. 2 loculare affinites placentæ cum Congea etc. maxima.

I met with three forms of this genus about Malacca, of which the following are the differential characters, and detailed descriptions drawn upon the spot.

2. *Avicennia resinifera* foliis lanceolatis accuminatis glabris subtus albidis, corollæ lacinia postica integra, fauce subannulari, antheris inclusis, stigmata subincluso, fructibus apice cuspidato-attenuatis, rugosis, embryonis radicula infra apicem villoso-barbata.

A. resinifera Forster? Jack Mal. Misc. 2,58 sub Pyrrhantho.

Arbor mediocris. Folia subtus vix reticulata. Flores parvi.

Desc. Arbor. ramulis articulatis.

Folia lanceolata acuminata subintigra, coriacea subtus albida, but without tomentum vix reticulata.

Spicæ axillares et terminales, ramosæ ferrugineo-velutinæ.

Flores parvi, several times smaller than in the other, oppositi inferiores distantiusculi superiores, conjesti, 3-bracteati.

Calyx 5-partitus læciniis oblongis.

Cor. subrotata, 4-partita extus velutina. Æstivatione fere valvata, thickened at the faux almost into an annulus.

Stam. fauci inserta. Filam. breve incurva. Anth. bilocular. introrsæ; cells as it were folded together, mucronulate.

Ovarium oblongum *pubescens*. Stylus brevissimis robutus. Stigma bifida vix ultra faucem exsertum.

Placenta etc ut in altero sed brevior, ovula viewed as opaque bodies, present white points.

Fruit with a surface like the under one of the leaves, transversely wrinkled, lanceolate, compressed, lengthened into a longish point at the apex, edges slightly furrowed, at the base of the calyx, but this is not forced to spread out as in the other, bivalvular.

Placenta at the base of the seed on one side.

Seed *conform*, without integuments, inner cotyledon projecting beyond the apex of the outer, both cotyledons are deeply bilobed, at the base.

Radicle long, inferor, just below the conical apex with a thick brush of hairs.

Hab. In limosis littoral Malacca.

This is the species to which Jack alludes sub Pyrrhantho, Mal. Misc. 2-p. 58.

Avicennia foliis lanceolatis acumianatis glabris subtus albidis, floribus (parvis) 4-partitis fauce subannulata. Antheris subinclusis fauci insertis. Stylo brevissimo, stigmata subinclus. Fructus apice attenuatus, rugosus. Radicula, infra apicem villoso-barbat.

Villi radicis septuli.

Avicennia.

Cal. 5 partitus, imbricatus. Cor. regularis vel subregularis rotata (carnosa) lacinia postice integri vel emarginata.

Stam. 4, subæqualia sinubus vel fauci inserta.

Ovar, 1-loculare, placenta centrali (4-gona) ovula 4, pendula ex apicem placentæ (inter angulos). Stigma bifidum.

Fructus, capsularis, bivalvis, 1-spermus. Semen albuminos. (tegumento 0. !) radicula villosa infera. Cotyledon conduplicat.

Arbores ; ramulis articulatis foliis oppositis integris.

Flores spicati, oppositi, inconspicui certe ad oleus spectans.

3. *Avicennia intermedia*, foliis obovatis, ovato-lanceolatis vel lanceolatis, acutiusculis subtus albidis reticulatis, floribus capitellatis, sepalis ciliatis, corolla lacinia postica sæpius integra. Staminibus subexsertis, stylo conico bipartito inclusa, fructibus amydaloideis vix compressis, albo pubescentibus embryonis radiculæ infra apicem villoso barbata.

Frutex. Flores mediocres.

I only met with this on Pulo Java close to Malacca, it is probably a hibrid between the two preceding species.

Desc. Frutex : 4-5 pedales ramulis 4-gonis. Folia obovata vel ovato lanceolata pallida integra coriacea subtus alba, quasi brevissime tomentosa. Exactly intermidiate between A. tomentosa and resinifera.

Pedunculi axillares et terminatis, the axillary ones solitary in the last axils 4-goni simplices vel divisi.

Flores mediocres, incapituli pauciflori terminali dispositi with a tendency sometimes to become racemose, intermediate in size between the two other species, 3-bracteate. Sepal pulchre ciliatis Cor. subrotata 4-partita, laciniis integris, postice paullulum latior. Stam 4 fauci inserta just below sinuses. Anth. basi affixæ subexsertæ, conduplicatæ. Stylus robustus brevis subulato *conicus* bipartitus laciniis approximatis glaber. Ovarium cylindraceum, pubescens placentata ut in aliis.

I have only seen this on Pulo Java, close to Malacca:

all the specimens were shrubby. It may possibly be a male between the two before described species.

Fruits very small amygdaloid compressed apiculate by the style, glaucous rugulose, at the base of the corolla and calyx, 1-valved coriaceous.

Outline of embryo or seed, cordate-ovate, inner cotyledon projecting a little beyond outer. Radicle barbate below, subtruncate.

Avicennia intermedia foliis obovatis. Frutex ramulis 4-gonis ovato-lanceolat. vel lanceolatis, acutiusculis subtus albidis reticulatis ; floribus capitellatis (mediocribus) sepalis ciliatis. Cor. infundibulif. rotata, laciniis subæqualibus, postice sæpius integra, æstivatione imbricata. Stam. subexsertis. Stylo coneco breve bipartito incluso. Fructus pario vix compresso, albo pubescento, radicula infra apicem villosa barbata.

4. *Avicennia obovata*, foliis obovatis, glabris subtus reticulatis, corollæ lacinia postica latiore emarginata, antheris exsertis, stigmata exserto bifido, fructibus amygdalinis, dense ferrugineo-tomentosis, embryonis radicula dense villosa.

A. tomentosa. Roxb. Fl. Ind. 3 88.?

Arbor. mediocris. Folia obtusissima. Flores ratione generis majusculi.

Descr. Arbor. mediocris, ramulis articulatis. Folia opposita, obovata obtusissima coriacia integra utrinque glabra, subtus pallida.

Spicæ axillares, (et implices, terminales) ramosæ.

Flor. majusculi, oppositi inferiores distantes superiores conjesti : tribracteati.

Calyx profunde 5-partita lacin. oblongæ apice sphacelat ciliatæ, lacinia postica omnino exterior.

Cor. subrotata subregularis, 4-partita lacinia postica majore, emarginata carnosa.

Stam. 4, sinubus inserta, filam. subulat. one line long, Anth. bilocular. subcordatæ introrsæ basi affixæ.

Ovar. stylo reclinato, subulato.

Stigmata bifido oblongum : ferrugineo-pilosum : 1-loculare. Placenta centralis libera, 4-gona. Ovula 4, clavata, pendula ex apicem placentæ *inter angulos* apicem umbilicata, no distinction of coats.

Avicennia foliis obovatis glabris, subtus reticulatis fl. spicatis inferior distant. superior conjestis, (magnis) 3-bracteatis. Sepalis 5 5tum extima. Cor. laciniæ postica latiore emarginata, filamentis mediocribus, anther exsertis, stigma bifida exserta, fructibus amygdalus dense ferrugine tomentosis, radicula dense villosa.

Although this has the leaves in shape as in A. tomentosa, Roxb. Fl. Ind. 3, 88, and though there are other marks of agreement, yet the leaves are perfectly smooth, and the flowers can not be said to be numerous.

After the corolla is fallen the style becomes much more reclinate.

Frutis like an almond, but more compressed, often inæquilateral surrounded at the base by bractes and calyx, covered with a dense velvet light ferruginous down, marked at the apex with a scar of the style and along both the edges with an obscure line. 1-valved ; coriaceous lined inside with a white delicate rice-papery cellular tissue.

Seed without any teguments, green, filling the whole cavity.

Cotyledons, conduplicate, one quite in the sinus of the other.

Radicle (after germination ?) much lengthened subclavate densely villaris.

Hab. In limosis inundatis Malacca.

Pl. CCCCXLVIII.

The development of the embryo presents in Avicennia great anomalies.

The ovula are nucleary.

The embryo sac Fig. I. when mature is curved within the point of the nucleus in the shape of a retort, or shepherd's crook. The line of the axis corresponds rather with the longer extension backwards, the recurved points however corresponds with the axis of the ovulum, appearing as if it were going to meet the fascicle of vessels that is to be found in the upper ½ at least of the central denser tissue of the ovulum.

It is within the curve that all the changes take place, 1st in the formation of albumenary tissue, sometimes without application of boyaux, the long extension backwards and the recurved apex remaining unchanged the boyaux appear to pass into the crook, to a considerable depth nearly to the base of the recurved unchanged apex, they here appear *obscurely* to form the rudiments of a cellular mass, which is the future embryo, but is exceedingly indistinct, all these may occur within the ovulum.*

The albuminous mass enlarging forwards, soon protrudes, and rapidly assumes a considerable size.

Its aspect is cellular, shape flattened roundish, then a curved line appears, an semper, on its outer surface, from which the cotyledons soon protrude.

This mass continues to increase, the lower part preserving its thick, cellular appearance, the upper or that between the inner cotyledon and the nucleus becoming expanded, flattened, and cellular membranous.

The cotyledons become conduplicate at a rather early period, subsequently the whole of the embryo except the radicle is quite naked, that remains in its cavity in the fleshy base of the albuminous mass. Correspondingly, the posterior extension passes back into the placenta where it becomes dilated, and ramified, and exceedingly large.

So far as I have seen the recurved apex remains unchanged up to a latish period. Yet I have thought I have seen it

* I think I have seen in one instance grumous matter in the sac without any attachment of boyaux.

become smaller as the albuminous mass increased in size; smaller certainly just as the cotyledons are going to protrude; the nucleus undergoes no change.

1. The anomalies are, curvature of the embryo sac.

2. Protrusion of the albuminous mass beyond the ovulum, while the sac originally was internal.

3. The protrusion of the cotyledons, nakedness of embryo, but above all the direction of the radicle, the funiculus of which points to, and not from the apex of the nucleus, which also appears to be its direction at a every early period.

This also is well worthy of notice, as confirming the permanence of the direction of the radicle—that in the mature seed, its general direction is such as it would have been, had the cotyledons passed up inside the ovulum.

The anomaly of direction in the embryo, if the line of first appearance, which is axile, is considered is not so great as it would, at first sight appear. Although there is no appreciable mechanical cause, why the cotyledons assume so strange a direction.

Soon after evident impregnation, the fertilised ovule is twice as big as the others, is split open at its apex from which protrudes a fleshy soft roundish mass, and inside its pressure shews the presence of a roundish body.

The centre of the protruded mass is more membranocellulous, and to it, portions of tubes may be seen adhering.

During inflorescence, and even when the stigma is blackened the ovula (some times 3) are club-shaped with an umbilicate or lobed apex, from the centre of the umbilical cavity of one at least, an obscure small protrusion was observed; the ovula appear solid: pressure however causes the escape the grumous fluid; at this period a single tube may often be seen running down to the apex of the ovulum.

From the navel or sinus of the lobe, there appears to be an obscure channel leading to a less obscure cavity, towards

the centre of the ovulum, whether this has a lining membrane or not I cannot say, but its surface is irregular.

At a later period, but before the young fruit projects beyond the calyx, the protruded mass will be found larger (as well as the nucleus): from it near the nucleus and on its outer surface, projects a bilamilar body, which is the embryo, the protruded part about the fissure is membrano-cellular.

The two lamina are the cotyledons when detached, they are found to be even now unequal, the outer one being shorter, and arising as it were lower down the base of the placenta; opposite each end of each ovulum is conductile, but much more so opposite the fertilised ovule, the protruded mass of which seems to adhere to it, (*i. e.* to the conducting tissue.)

The protruded mass is more intimately connected with the nucleus by a gut or tube, which lines its central cavity. It is I imagine from the protruded end of this sac, that the protruded albuminous mass is formed, *it is highly divided*, so that it is a Santaloid tube inverted.

The shorter cotyledon is now bilobed, or biauriculate at the base.

The tubular portion internal to the nucleus appears to reach at least to its base; but it is difficult to ascertain its doing so, owing to the denseness of the tissue surrounding it, which forms as it were a columu reaching throughout the ovulum. The apex of the protruded mass is cellulo-papillose. The tube certainly exists, and appears to be continued to the centre of the protruded mass.

The mass subsequently protruded, appears to be at one time enclosed within the apex of the nucleus, and the inner tube which is then tortuous, appears to be outside of the columnar tissue; even at this time the centre of the mass is discolored, and presents traces of the embryo, and its lax cells are obscurely traceable to the apex of the mass.

Judging from appearances, I should say, that the mass has

linear relations with the columnar central tissue, and that the tube is a subsequent formation being developed from the base of the mass, and running along between the column and that space of the ovulum next the placenta, that it is a lateral formation, that the mass is developed in a sac, arising from the end of the column—the embryonary sac, the communicating tube is branched at an early period.

Pl. CCCCXLVIII. Fig. VII.

a. The cellular substance evidently encloses the apex or upper half of the sac.

b. Base unchanged and I imagine from a single instance that it is thus.

c. Embryo sac.

d. Albuminous mass.

e. Certainly part of the sack.

f. Sac.

g. Albuminous mass.

h. End of boyaux entering.

i. Columnar centre.

j. Nucleus.

k. Less changed base of embryonary sac certainly closed.

l. Cellular mass just becoming protruded.

m. Embryo arising from a boyau *(assumed)*.

n. Common tube.

o. The membrane of the sac is here and there traced.

At the time of inflorescence or very soon after, the columnar tissue is very evident, appearing to be continuous similar to that of the placenta ; the situation of the sac is at this time occupied by opaque tissue.

After the protrusion of the cotyledons, the nucleus and subalbumen do not undergo much if any change, the cotyledons have commenced to be conduplicate, when twice as long as placenta, the nucleus when then unchanged in size is very hard, the subalbumen is enlarged, the radicle is still enclosed in it.

The communicating process is at this time easily separable.

There is no change of direction in the embryo, the protrusion being effected by the cotyledons, all that is required is a certain degree of obliquity as regards the nucleus or else they would pass it.

On a transverse section, have I seen in the placenta the dense central part with a tendency to be 4-lobed, but even at a later period, nothing like a section of the communicating posterior tube was observed.

It follows hence that the chief anomalies are the formation of the albuminous tissue outside the sac of the embryo, the penetration of this by boyau, the protrusion of the albuminous mass so formed, and the subsequent protrusion of the cotyledons.

The unique? ones are the formation of the albuminous mass outside the sac of the embryo, tho' the embryo is formed within the sac! and secondarily the *protrusion* of the cotyledons, the radicle remaining enclosed. Also the deposit of albuminous tissue on a sac, internal to the nucleus, and the laterality of the posterior extension.

To be carefully examined again, particularly with reference to the early state of embryo sac, the extent of the posterior communication, and to the embryo just before the cotyledons protrude.

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1. *Verbenaceæ* sp. Pl. CCCCXLVI.

Calyx tubulosus 5-dentatus, denti postica minore persistens. Cor. infundibulif. subregularis tubo subgeniculata immulat. Stam. inclusa sessilia, inferiora (vel his inter lobos labii inferiofis) superiora et majora.

Stigma capitatum. Nuces 4, extus venosæ, intus verrucosulæ.

Inflorescentia spicata, flores 1-bracteata.

Raphe initio externa quoad axin demum interna, ovuli develop. ut in compositis.

1. Flower just expanding.
2. Flower front view.
3. Corolla laterally.
4. Corolla laid open.
5. Anther front view of.
6. Ditto back.
7. Laterally.
8. Pollen in water.
9. Ovarium front.
10. Ditto lateral.
11. Longit. section.
12. Ovulum raphal face external.
13. Fruit.
14. Nux front or inner view.
15. Ditto laterally or outside.
16. Ditto longit section.
17. Ovulum.
17*a*. Embryonary sac, separate.
18. Ovulum, more advanced, *a* testa and nucleus combined, *b* embryonary sac, *c* embryo just developed.
19. Half ripe seed, same numbers have same references.

Bamo. Upper Burmah May 5th, 1837.

2. *Verbenaceæ* sp. Pl. CCCCLX.

Itinerary notes p. 112, *no.* 164.

HAB. *Bootan.*

Volkameria sp. Pl. CCCCXLIV.

Itinerary notes p. 128, *no.* 504.

HAB. Bootan.

Premna herbacea, Pl. CCCCXLVII. Fig. I.

Itinerary notes p. 96, *no.* 1422.

LABIATÆ.

General remarks. It has for some time, struck me that neither Labiatæ nor Borragineæ are formed on a quarternary plan as to the carpella. I was first led to this opinion by observing in a series of observations, the constant relation between the number of vascular fascicles of the style, and that of the carpellary leaves entering into the formation of the Pistillum.

This view appears to have been hitherto neglected.

In the cases in which the number of vascular fascicles exceed that of the carpellary leaves, the law remains unchanged, owing to the evident arrangement of the bundles of vessels or fascicles into groups corresponding with the number of the carpellary leaves.

A still more obvious circumstance is to be taken into consideration, that is the number of styles. If we pass in review the whole of syncarpous orders, we find that the number of styles however united they may be, (and in this case only determinable by the number of vascular fascicles,) it is constantly the same as that of the number of carpella, and this law is most obvious in the gynobaseous orders. Further it remains to be proved whether in one single instance the carpellary leaf is developed into an ovary or portion of one, in which the style or stigma remains undeveloped.

Perhaps the contrary is the fact, the style or stigma being hence the most permanent part; of this I only know one instance, and that is in Clypea or rather Cissampelos.

The structure of Borragineæ and Labiatæ, is to be explained either by assuming the abortion of the styles, etc. of two carpella, or of their binary coalescence. The former explanation can scarcely be considered as sound, for there is not a single instance that can be adduced in its support. Of the latter there is no external (as indicated by furrows or lobes of the stigmata,) or internal evidence. The pistils

of Boragineæ and Labiatæ are therefore on grounds of all analogy of structure, formed on a binary plan. It only remains to explain how the anomalous structure arises.

A bilocular single carpellum may arise either from extreme inflection of the dorsal suture, (to which there is in many instances a tendency,) or of extreme inflection of the combined placentæ. But from the complete division of the two carpella that exists in the above two orders, as well as perhaps from the situation of the ovula, we are authorized in considering the anomaly as arising from complete inflection of the dorsal suture. Although in Verbenaceæ, Ehretiaceæ, Cordiaceæ, and etc., the quadrilocularity of the ovarium arises from an opposite cause. There is likewise another circumstance to be mentioned as pointing out the correctness of that which we have above stated, this is the almost universal basilarity of the styles. This shews that the lobed state of the carpella is more developed towards the geometrical apex, a fact in accordance with the structure of all syncarpous fruits. The only objection to this exists in Cynoglossum, in which the style proceeds from the geometrical, which, is hence the true apex.

It was perhaps from the consideration of this genus, that Brown in his Prod. describes the ovula as pendulous, hence shewing his usual extreme acuteness. I find in addition, that this is proved by taking into consideration the situation of the raphe. This in Labiatæ is next the axis, hence the lobes of the ovarium are not inverted, but in all Boragineæ except Cynoglossum, it is external with regard to the axis, proving that the lobes are inverted. It is highly curious, that in such, with one exception, there is an obvious tendency in the raphe to revert to its true site, viz., next the axis, since the foramen in all these is at the lowest point of the cavity, while the radicle of the mature seed points to the uppermost. The seed is hence adhering, and in its development describes a considerable portion of a circle.

Cordiaceæ in relation to what I have said above, require examination, since they have four stigmata. But this may arise from another cause, and one that has reference to the origin of the stigmata themselves.

Magong : April 17th, 1837.

PLECTRANTHUS.

Plectranthi sp. Pl. CCCCXLIX. Fig. II.

Caulis et prolongationes axis virides, fol. supra saturati-viridia hinc illinc secus costa maculis albis irregularibus, subtus pallidis.

Cor. carnea, vel pallide rosacea. Calyx præsertim fructus viridis.

Kuttack Boom : Oct. 1st, 1837.

SALVIA.

Salvia plectranthoides, Pl. CCCCL.

Itinerary notes p. 163, *no.* 845.

HAB. Bootan.

OCYMIUM.

Ocymii sp, Pl. CCCCXLIX. Fig. III.

1. Long section through 2 ovaries, shewing the situation of the raphe.
2. Ovulum, at the time of expansion.
3. Inner structure as demonstrated by pressure, nucleus and testa incorporated, no raphe.
4. Embryonary sac from an ovule, just after the fall of the corolla. This approaches to the membranous structure, is developed from the base of the nucleary cavity, but is distinctly cellular at its base, its apex is attenuated into a thin thread which communicates with the

apex of the nucleus, $\frac{1}{2}\sigma$ lens will scarcely demonstrate any cells except at its base, it is attached by a single cell; at the apex of the broad or dilated part is seen the embryo just forming.

5. Long section of an ovule more advaced, embryonary sac distinctly cellular.
6. Ovule viewed on its inner or raphal face, raphe evascular composed of fibres.
7. Long section of ovulum more advanced. Cotyledons opposite the raphe.
8. Portion of testa shewing the cellularity, of the nuclei.
9. Section longitud. of seed, thro' short diameter or at right angles with the axis.

This development is remarkable for the evolution of the embryo, at a distance from the foramen and apex of the nucleus.

The seeds have two integuments, testa and embryonary sac.

Hab. Upper Assam *Suddyah: July*, 1836.

Mentha.

Mentha auricularia.

Herbacea, hirsuta, caulibus decumbentibus foliis lanceolatis vel lanceolato-ovatis rugosis grosse crenatis; floribus albis, filamentis ad apices antherisque purpurascentibus.

Cal. tubulosus, subæqualiter 5-dentatus, exangulosus dentibus ciliatis.

Cor. infundibuliformis: calyce duplo longior; dentibus 4, subæqualibus, vel 2 majoribus, 2 paullo minoribus.

Stam. didynama exserta, corolla duplo longiora. Filam, filiformia, medium versus stuposa. Anth. transversim dehiscentes, 1-loculares, connectivo carnosa.

Ovarium ordinis, stylus filiformis staminibus paulo brevior, apice bifidus, stigmata 2 obtusa.

Inflorescentia dense spicato, verticillata, centripeta verticelli florum plerumque biseriates bracteis lanceolatis ciliatis suffulti.

In humidis. Mergue: *July*, 1834.

Lamium.

Lamii sp. Pl. CCCCXLIX. Fig. I.

Itinerary Notes p. 126, *no.* 459.

Hab. Bootan at Balfai.

BORAGINACEÆ.

Myosotis.

1. *Myosotis* sp. Pl. CCCCLVI. Fig. I. and II.

Annua, pubescenti-hirta, basi prostrato-decumbens, ramosa. Fol. alterna sessilia obovato-lanceolata subintegra mucronata. Racemi axillares terminalisque nudi, bases versus composito apice simplices juniores circinata. Pedicellis, bracteis breviores fructus deflexi. Flores parvi inconspicui albo-cærulescentes.

Cal. profunde 5 partit. laciniis lanceolatis acutis hispidis.

Cor. infundibuliformi-rotata tubo calycem paullo excedente, laciniis 5, rotundatis, æqualibus, æstivatione imbricatis lacinia una exterior una interiore. Faux semiclausa processubus 5, petalis oppositis ex horum basibus ortis carnosis papillosis subemarginatis. Processus carnosa papillosa 10 basin tubo inserta, 5-petalis, 5-staminib. opposita. Stam. 5 medio tubo inserta. Filam. brevissim. Antheræ basi affixæ quasi pellatæ subversatiles biloculares, loculis discretis introrsum dehiscent. Pollen oblongum vel parallelogram.

Ovaria 4 liberis basi latiuscule affixis trigonis depressis, subglabris, 1-sepalis lateralibus et 2 anticis opposit. Stylus brevis, fasc. vasc. 2, stigma capitatum emarginatum.

Ovula solitaria apicibus loculorum medianti funiculi longiusculi affixa, quoad axin plantæ ascendentia potius retort-shaped, tegument. discrimen 0, apex verus funiculo approximato elongato cellulo. Nuces 4 distinctæ, basibus affixæ a stylo marcesio omnino liberæ, exsertæ, subosseæ, depressæ trigonæ, angulis obsoleti-marginatis, lineo punctatis, et pilis apice leviter uncinatis brevibus pubescentes, basi umbilicatæ, et obscure perforatæ.

Semen ovato-globosum, obliquum, liberum, inversum. Tegument exterius celluloso-membran. (viridescens, interius conforme membranaceum,) funiculo longo filiforme inter chalaza e vasc. fasc. 2 simplices curvatæ umbilicum recondito. Cotyledones carnosæ, antico utrinque convexo, postico hinc concavo illinc convexiuscule. Plumula inconspicua. Radicula supera quoad axin, quoad carpellum infera.

Hab. Assam. Ad ripas arenosus Burrumpootur: *March* 31*st*, 1836.

2. *Myosotis anchusiformis* Gr. Pl. CCCCLVII. Fig. I.

Annua valde ramosa, basi prostrata, pilis albis patulis nec ait in præcedenti appressis hirta. Fol. sessilia lanceolata mucronata subrepanda, superiora ovata. Racemi axillares terminalisve elongato-foliacea, compositi-simplicesve, interdum dichotomi juniores circinati. Pedicelli extra axillares, foliis bracteisve propinquis breviores, demum deflexa et semper latere folio propinquo opposito. Flores parvi inconspicui albido-cærulei.

Cal. basin usque fere 5-partitus, laciniis lanceolatis hispidis ciliatisque, 5ta postica, fructus vix mutatus.

Cor. infundibuliformi-rotata, tubo longitudine sepalorum, subcylindrico limbo 5-partito, laciniis rotundatis æstivatione imbricatis.

Faux clausa processubus 5 carnosis papillosis subfornicatis emarginatis.

Stam. medio tubi inserta. Filam. breviss. Anth. basi affixæ quasi peltatæ inclusæ bilocul. introrsæ. Processus 10 cellulosi papillosi 5 petalis, 5 staminibus opposit. ima tubo basi inserti.

Ovariæ 4 distincta basibus in loculis totidem cruciatis immersis, loculorum parietibus e disco glanduloso repando ortum ducentibus.

Ovaria basi lata affixa, ovalia, apice rotundata glabra, medio interne posticeve, umbilico maximo parum profundo notat.

Ovula solitaria erecta quoad axin plantæ, quoad ovarium pendula. Tegumentum cum nucleo aggutinat. *foramen* ? conspicuum, posticum.

Stylus 1, filiformis brevis vasc. fasc. 2. Stigma capitat. emarginat. Calycis fructus basis parum ampliata, turbinata.

Nuces 4, osseæ erectæ distinctæ basi lata affixæ, subimperforatæ reniformes non compressæ, muricatæ, muricis papillosis, brunneo-virides. Sinus annulo læviusculo obsolete radiati-striato circumcinctus, nivens osseus striatus, umbilicatus et profunde perforatus. Nuces parietes binato exterior e quo oritur sinus umbilicus ossea, interior e fibris brevibus constrictur, et fundum umbilici format.

Semen nuci conforme erectum. Tegumenta bina exterius membranacea, hilum prope micropyllum conspicuam vix mutatam gerens, interius tenuis embryonem vestiens. Vascularum fasc. 2.

Chalaza e vasc. fasciculis 2, quorum alter simplex curvata currit, alter varie ramosus apicem seminis attingit non anastomosant.

Embryo erectus albus paullo curvat. Radicula conica hilum prope et postiæ situs. Cotyledones plano, convexiusculæ, umbilici perforati parallelæ. Plumula inconspic.

Hab. Assam. Ad ripas arenosos Burrumpootur : *March* 31*st*, 1836.

Flores omnino præcedentis, ast habitu potius Anchusæ

distinctissimus ob ovaria umbilicata, foramen structura nucum et embroyonis directionem.

Obs. Notu dignum est umbilicum hujus ab umbilico Myosotidis origine discrepat. In hoc enim, pars apparatus fecundationis est, in illa minima. Foramina ordinis hilo approximata sunt et postice sita, ex hoc oritur directionem ovularum.

Omnium generum hujuscum ordinis radicula supera post fecundationem mutatur, foramine nempe gradatim supero facto.

Præcedens genus distinctum constituere videtur Anchuseæ et Cynoglosso proximum.

Nuces 4, basi affixæ, reniformes papilloso-muricatæ. medio umbilicatæ et perforatæ. Radicula infera.

De numero normali foliorum carpellorum dubito, an bina, (quaterna tantum horum divisione) ob style faciculorum vasorum numero binato? Dubito etiam de origine rapheos, an e fasc. vasc. styli? Fecundatio scrutanda, scrutandus etiam situs foliorum flores fulcentium et bractearum typus normalis ordinis forsam nudifloues.

Cynoglossum.

1. *Cynoglossum racemosum,* Pl. CCCCLVII. Fig. II.

C. canescens, Willd.

Cal. 5-6 partit. Cor. subinfundibulif., tubo brevi ovato subventricoso, *apertura basis cruciata* fauce squamis transversis bicallosis semiclausa, limbo 5-6 partito, laciniis ovatis obtusis.

Stam. tot quot laciniæ iis alternantes, tubo medium supra insert. Filam brevia. Anth. inclusæ, biloculæ introrsæ longitudinaliter dehiscentes. Pollen minutissim. læve.

Ovaria 4 stylis conjuncta hispida, styli in unum brevem coaliti. Stigma capitat. e marginatum. Nuces 4 in axim. 4-angulata pyramidalem oblique insidentes, obovatæ parte angustiore cum stylo nunc elongato continua, supra convexa,

setis capitatis, setulis uncinatis armatæ, infra ad partem attenuat. complanatæ lævesque, (situs insertionis) 1-loculares, nigro-brunnea.

Semen nuci conforme et ejus cavitatem toto replens, pendulum embryo inversus, radicula conica partem attenuatam nucis obversa. Cotyledones carnosæ ovules, incumbentes. Plumula inconspicua.

Hab. Bengal. Ad ripas Jellinghey ubique. *Sept.* 8*th*, 1835.

Obs. The genera of this section, viz. those with the fruits attached to a central axis, shew us, that in Boragineæ deprived of such axis, and perhaps in Ochnaceæ, the ovarium is inverted, and that the style arises from the apex, not the base of each carpellum.

2. *Cynoglossi* sp. Pl. CCCCLII.

1. Plant natural size.
2. Flower.
3. Corolla laid open, scales of base to be re-examined.
4. Anther, lateral and back views.
5. Calyx spread open, shewing the curious sinuses and the pistillum.
6. Fruit.
7. Immature nut outer view. 7*a*. Place of attachment of foramen.
8. Ditto inner.
9. Seed.
10. Embryo.

Genus verrisimiliter novum, habitio Myosotidis cui generi corollæ structura accedit. Itinerary Notes p. 243. *no.* 361.

Abomnibus (paucis) mihi cognitis differt. calycis structura sinubus, nempe bifidis, pilis uncinatis congregatis armatis, demum ampliate bilabiate, *fere plani* arcteque clausi.

Denique nucibus auriculiformibus complanatis et mutuo compressis.

Raphe ordinis sed cito bifurcata.

Re-examine the calyx to see what actual changes the sinuses undergo, examined in a hurry, as all must be, while travelling in a new country.

Hab. Affghanistan Quettah: *March 27th*, 1839.

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1. *Borragineæ*, sp. Pl. CCCCLIV.

I have omitted to number this Borragineous Plant, which is in some respects of singular structure, two of the nuts are much more echinate than the other two, in which there also exist a tendency to become of a cup-shaped form, a tendency by no means as usual in the Borragineæ of this country and which is carried to its maximum in certain forms of Cynoglossoides, and another beautiful species. The pendulousness of the ovula points out the affinity of this plant to Cynoglossum and its associates, and I think the structure of the scales points out a greater than usual tendency to glandular and hence the staminal structure.

Hab. Affganistan.

2. *Borragineæ* sp. Pl. CCCCLV.

Itinerary Notes p. 223, *no.* 148,

Hab. Affghanistan.

3. *Borragineæ* sp. Pl. CCCCLI.

Itinerary Notes p. 231, *no.* 230.

Hab. Affghanistan.

4. *Borragineæ* sp. Pl. CCCCLIII.

Itinerary Notes p. 222, *no.* 147.

Hab. Affghanistan.

PLUMBAGINACEÆ.

ÆGIATILIS.

Ægiatilis rotundifolia, Pl. CCCCLXI. Fig. II.

Frutex, trunco conico, basi valde ampliato, et extrorsum in processus carnosus product. more Rhizophear.

Ramis cicatricibus folior. lapsis notat.

Fol. alternia longe petiolata, deltoidea orbicularia, glabra subcarnose pulcre reticulata, integerrimo, nervis secondariis indistinct. Petiolis longis, amplexa caulibus, alatis, alis involutis, convolutisque cunale fluido viscoso-aquosa repleta formant ! ! ! canale ad apicem subobsolet. marginibus in corpus petiol. nempe ad presso.

Racemis axillarib. paniculato dispositis, fol. subæqant. terminalibusque pedunculis petiolis basinque amplexis.

Pedicellis erectis, bracteis lanceolatis convolutis viridibus, bracteatisque binis inclusis subconvolutis stipatis, fluida viscosa, pedicellum inclusum ambiens, floribus majusculis albis.

Cal. gamosepal. marcescens 5-dentatus, tubo longiusculo, obtuse 5-carinato, dentibus submembranaceis.

Cor. subhypocraterif. tubo brevissimo 1-lineatim cylindrico profunde 5 partit, laciniis linearib. obtusis subconcavis, erecto-partiatit.

Stam. tot quot laciniæ corollæ iis oppositæ ! ! apicem tubo inserta, filam. subulat. libera. Anth. erectæ exsertæ sagittatæ, biloculi lateraliter dehiscent. Pollen magnum, læve punctulat. longit. sed vix centraliter sulcat. 3-sulcat. aqua immersa poris 1-3 dehiscens.

Styli 5-filiformes exserti, apicis varsus patentis. Stigmata totidem spathulato-clavis.

Ovar. super. liber, angulis 5, prominent, 1-loculare, 1-ovulat. ovulum *errecto*-pendulum ab apice funiculi longi, apex apice locul spectans more Plumbaginiarum, foramen conspicium ad apicem ovuli.

Hab. Mergue. Inter Rhizophoreas uti insulæ Madamac. satis frequens, *Feb.* 1835.

Plumbago.

Plumbago Zeylanica.

Herbacea caulibus laxis subprocumbent ramosis, foliis alternis breviter petiolatis ovatis acutis in petiolum attenuatis, repandis. Petiolis, basi dilatatis biauriculatis.

Spicis axillaribus terminalibusque, bracteis foliaceis lanceolatis floribus albis. Anthers cæruleis. Pedunculis calycibusque extus glanduloso viscosis. Cal. tubulosus, 5 dentatus extus glanduloso-pilosus. Cor. hypocraterif. tubo subcylindrico calyce duplo longiore limbo 5-partito laciniis subobovatis mucronatis patentibus. Stam. 5 hypogyna petalis alternantia, filam tenue filiform longitudinis corollæ, basi glanduloso dilatat. Anth. oblongæ biloculæ longit dehiscent. exsertæ. Stylus filiform staminibus paulo brevior stigmato 5 papillose. Ovarium loculare 1-ovulat ovulo pendulo foramen hilum versus ! capsula 5 gona, 1-superma.

Fig. III. Pl. CCCCLXI.
Ovulum.

Hab. In ruderatis Mergue, *Sept.* 1834.

Statice.

Statice sp. Pl. CCCCLXI Eig. I.

A shrubby plant, each forming a rounded dense tuft.

Ramis lateral decumbenti-prostratis reliquis foliorum spinosorum vestitis, apice proliferis, parti prolifera distinguendum processubus revolutis gemmarum squamarum in loco habend.

Fol. dense imbricata, adeo ut ternata verticillata videntur, basi concava membranacea lamina plano-convexa rigida spinosa, primo erecta, mutuoque applicita, patentia tunc patentissima, demum recurva, pubescentia.

Spicæ axillaris rami unius vel solitaria binatæ (anpluris ?) basi fragillimæ, flexuosulæ, compositæ, infra foliis distanti-

bus, subamplexicaulibus, parvis e basin lanceolata, spinoso-acuminata.

Spiculæ secundæ axillares, distantes terminales præcociores, constanter e ramulis 2-bracteis pubescent. carinatis, interioribus scariosis *convolutis* distinctis omnino tectis-unifloris. Flos terminalis præcocior.

Calyx infundibuliformis, tubo bracteæ internæ longitudine, lamina plicata scariosa, alba, venis 5, saturatissima brunneis, interveniis prominentibus, æstivatione imbricata plicata.

Corollæ e petalis 5, patente revoluti, basi in cupulam carnosam connatis, longe lineari-spathulatis, subretusis, erosulis, vena magna centrali simplicissima ! roseis.

Stam. tot quot petal. his ad basin partes liberæ adnata. inæqualia, introrsa e petelis nunquum liberifactis. Antheris subversatilibus *(centro affixis)* oblongis biloculis longit. dehiscent. Pollen e globoso, filamentis gracilibus, æstivatione erectiusculis.

Pistillum oblongum, 5-costatum, costa quaque desinente in stylum asperulum e vasculosum, calycæ $\frac{1}{3}$ brevior. Stigmata 5 oblonga capitata, papillosa. Ovulum unicum pendulum e funiculo e basi loculi unici exorient.

Fructus, maturus non visus ; immaturum calycis limbo rotatum patente corollam simulanto; ovaro incluso, et tecto petalis marcescentibus inflexo-involutis cum staminibus. Stylisque oblongum 5-costatum, basi cupula glandulosa cinctum ; petalis staminibusque having been torn from their connection with it.

1. Portion of a tuft from one stem, nat. size.
2. Spikle single.
3. Alabastrum.
4. Corolla of ditto shewing æstivation.
5. Stamina of ditto front and back.
6. Single flower.
7. Do. laid open.
8. Base of Corolla shewing that the petals are united at their base into a glandular cup.

9. Base of one petal.
10. Another back view after dehiscence.
11. Pollen.
12. Pistillum.
12*a*. Stigma and portion of style iterum.
13. Long section of ovary.
13*a*. Ovulum.
14. Ovule and interior of ovary from a bud, corolla length of bractea shewing that the conducting tissue is formed at an early period, not a sudden appearance at the time of fecundation.
15. Young fruit, shewing the separation of petals and stamina from the glandular cup, a fact analogous to what occurs in Mirabilis.
15. Pistillum of do.
16. Calyx of fruit, in a young state.
16*a*. Same laid open, shewing the inflexion of the marcescent petals etc.

HAB. Affghanistan. Barren, rocky hills. Cabul et alibi.

OBS. Each flower to be looked on as terminal, owing to the presence of a bud in the axil of the last bractea.

The inflorescence only differs in degree from the paniculate or corymbose forms; in principle it is the same. Three or four other species of similar habit have been obtained by me, but only one of the paniculate form.

The conducting process is of early origin, and is at an early stage applied to the foramen, it is a formation from the stigmatic tissue. Lindley's explanation is not correct, the strap is never broad enough to hinder the process from entering the foramen.

EHRETIACEÆ.

EHRETIA.

Ehretia serrata, Pl. CCCCLIX.

Calyx, 5-partitus, æstivatione imbricatio.

Cor. 5 partita, æstivatione imbricata.

Stam, tot quot laciniæ corollæ iis alternæ, tubi brevi basin prope affixa, introrsa. Antheræ dorso affixæ biloculæ. Venatio corollæ normalis, filamenta vasculosa.

Stylus vasculis 2 donatus. Stigmata 2 subcapitatæ, canali infra in unum coalescenti.

Ovar. 4 loculare (spuria) ovula in loculis solitaria pendula, foramen superum hilum prope.

Inflorescentia paniculata, floribus nudis sessilibus in paniculæ ramis, sæpe aggregatis, Ehretia serrata Roxb. Vix Ehretiæ sp.

1. Alabastrum.
2. Flower.
3. Corolla laid open.
4. Calyx and Pistillum.
5. Stamen back view of.
5*a*. Ditto front or inner.
6. Pollen viewed opaquely.
6*a*. Ditto in water $\frac{1}{20}$.
7. Ovar. long section.
7*a*. Ditto shewing the conformation.
8. Ov. transverse section of the placentæ etc.
8*a*. Ditto towards apex.
9. Ovula.

Obs. The ovary is formed on a similar plan as that of some Verbenaceæ, the placentæ being involute and closely united, and towards the base of the ovary produced so far outwards as to divide each cell into two.

There is no line to indicate the separation of the two carpellary leaves, although there is an evident one travers-

ing the placentæ in the direction of their inflexion from the centre.

General remarks. The number of vascular fascicles of the style at once points out the binary formation of the ovary : but it is worth while examining, those species of Cordia which have *twice cleft styles* according to Roxburgh. And it is still further doubtful in taking the number of fascicles of the style into consideration, whether Labiatæ and Borragineæ have not their ovaria formed on a binary, and not on a quaternary plan.

Cordiaceæ are represented in India by several species, all are fruticose, and most, arboreous. They have but few sensible properties. See, Sebestina Myxa, and latifolia. The flowers are often odorous.

One species performs the same office, although in a smaller degree as Arundo arenaria etc. do in Europe, that is, binding together loose soil.

They are generally natives of Hills, and of rather high latitudes.

The leaves are remarkable for the extreme extent of the ramifications of the veins. So much so that the space occupied by these organs, perhaps exceeds that occupied by those of aëration.

None except Ehretia arenarium, *mihi*, which is found between 12° and 28° N. appear to have a very wide distribution.

Lindley characterised Cordiaceæ by a four cleft stigma, if this be the case, the style remaining undivided is a proof that the stigmata are prolongations of the placentæ. No one can explain the ovary of these orders by assuming only one carpellary leaf to be abortive. As I have long observed, this origin of the stigmata and the number of vascular fascicles of the style are worthy of great consideration, the latter in relation to the number of component parts of the ovary.

The flowers are occasionally polygamous as in C. Myxa, in

which likewise there are no bracteæ, not even to the primary divisions of inflorescence. In this species there is a tendency in the inflorescence to become unilateral and recurved.

PLANTAGINACEÆ.

PLANTAGO.

1. *Plantago* sp. Pl. CCCCLXII. Itinerary Notes p. 214, *no.* 84.

HAB. Affghanistan.

2. *Plantago* sp. Pl. CCCCLXIII.

HAB. Assam Gubru Purbut: *March, 6th* 1836.

VALERINACEÆ.

VALERIANA.

1. *Valerianæ* sp. Pl. CCCCLXIV.

HAB. Bootan at Ling-Ling.

2. *Valeriana violifolia* Gr. Pl. CCCCLXV.

HAB. Bootan at Panukha.

COMPOSITÆ.

General Remarks.

The inflorescence, or rather each capitulum is always terminal, that is, it either terminates the axis itself, or one of its axillary branches. The terminal one is invariably developed first; its origin is occasionally observed by the continuation of the axis, owing to the development of a branch in the axilla of the opposite leaf, as in Eclipta.

Is any stress to be laid on the external dilatation of the apex of the peduncle? when present it gives an idea of a multi-partite, not a polyphyllous involucrum.

Can the union of the ovary to the calyx be identified by the number of layers visible on a transverse section, as in those with biseriate pappus, and *no.* (1) 401, p. 230 in which the limb of the calyx is annular, the pappus arising internally.

Link I think lays some stress upon the distinction between pappus and paleæ of the receptacle,—what is it?

Plumose pappus is only an excess of development of the dentata.

Can the difference between a tubular corolla, and that which arises from an abortion of the *ligula* be always distinguished by the papillose oblique mouth of the latter?

What do these papillæ represent, are they always present in those in which the ligula is imperfectly developed? and which I take to be the case whenever the vascular fascicles are imperfectly developed. In such case they will represent lobes of the corolla: vice-versa are they absent in those, in which the ligula may be supposed to be perfect, what is the cause of a ligulate corolla, and what is its æstivation?

Mr. Brown says that the vessels unite with the apices of each lacinia. In those which I have examined this is not the case.

To what is the cohesion of the anthers to be attributed? particularly in those cases in which the substance of their cells seems to pass into each other.

They can scarcely, be distinct in an early stage.

The difference in the form of the stigmata in the radical and discal flowers of those in which the former are imperfectly corolline, or perhaps in all radiate, is worthy of notice, and points out an imperfection pervading every part, but the ovula excepted.

Is much dependence to be placed on the articulation of the style in Carduaceæ? This occurs in all, and its distinctness here only depends on the great development of the epigynous disk.

Has the style invariably 2 vascular bundles, indicating its binary composition ?

How is fecundation effected ?

In several the ovula cohere, at least partially with the ovaria, this is however not of much importance, since the seeds appear to be invariably free. Prenanthes *no.* (2) 445, p. 251 however leads me to suppose, that the seed may appear perfectly free, while in fact the testa adheres to the pericarp; this is not the case in the example cited. If this be true, the immediate covering or the apparent testa will be due either to the remains of the nucleus, or to the embryonary sac; in Prenanthes the latter is the case.

All that I have hitherto examined agree in the singleness of the integument and its intimate cohesion with the nucleus. They all agree in the mode of development of the embryonary sac which is attached by both its extremities, but chiefly by its base, and in the first appearance of this as a vesicle, at the apex of the nucleus.

The embryo however appears to be formed about its middle, instead of its apex as in usually the case. With respect to the raphe, they seem to differ, in some I cannot find it at all, in others it is developed gradually, and in these it appears to be generally, if not always complete, terminating in the margin of the foramen. The embryonary sac is very large in Prenanthes, *no.* (2) 445. p. 251.

Burrumpootur : *March* 23*rd*, 1836.

I am still more inclined to doubt the fruit being an Akenium; in every instance the testa coheres to the pericarpium. This is at once proved by the presence of the raphe on parts of it, when detached from its cohesion. The cellular membranous coat enveloping the embryo, owes its origin to the embryonary sac; this is at once evident by its having at both ends, remains of its original attachment. The nucleus, which however is never distinct, disappears altogether.

Although the transition from the perfect flowers of the disc, to those of the imperfect radial ones in those cases in

which all the flowers are tubular, is sudden; still the peripherial ones are more imperfect as to size at least, than the inner ones. Perhaps such should immediately follow Carduaceæ, particularly as many have appendages to the anthers, on the apical one, however I think very little stress is to be laid.

Thus beginning with Carduaceæ, we should pass on the Corymbiferæ commencing with those in which the radical flowers are tubular, thence to the Radiatæ through Erigeron or those genera which either have ligulate, or evidently a ligulate tendency, but in which either no ray at all is developed, or developed merely on the circumference, and thence to the true Ligulatæ, keeping up the chain with reference to the greater or less development of the radius.

Carduaceæ certainly are the most perfect, and Ligulatæ are the next.

Considerable mutability resides in the involucra, and the fact of their becoming incurved when the florets are removed for the examination of the receptacle, shews admirable design. Their contraction, for such it certainly is, although probably limited to one surface, is very distinct and strong

Is there any thing definite in the number of the pappus?

There is an obvious relation between the development of the epigynous disk and the stamina, for the disk is only developed to any degree in the hermaphrodite flowers—the only ones I have yet examined on this point. This is what one would have expected, the disk being a staminal organ.

The composition of the inflorescence has been shewn in every instance hitherto examined by me, except Sphæranthes in which it is centripetal, so far at least as the aggregate is concerned. In the others, the central and really terminal head is always first in development, so that it may be laid down as a rule, that all simple inflorescences are centripetal; all compound centrifugal.

The fact of the inflorescence of Sphæranthus being *cen-*

tripetal, both *en masse* and in detail, proves that it is a single capitulum, hence the generic character of Sprengel is nearly correct, although there is no true anthodium. It likewise suggests a certain affinity with Echinops.

That the paleæ of a receptacle are merely modified scales of the involucrum, in other words, bracteæ, is proved by their absence in those floscules which arise from the axillæ of the inner scales. Here again Sphæranthus is interesting, it has no involucrum, because all the axillæ produce capitula.

With regard to inflorescence, that of Gramineæ is not simple, but compound, the spiculæ of the spikes being most developed towards the apex, in other words terminal locustæ are the first developed.

Burrumpootur: *March 29th*, 1836.

The development of the ligulate flowers of Compositæ is connected with a very great enlargement of the laciniæ of the corolla. The development is centripetal, that is, two of the most distant laciniæ first take it up, and the ce ntral one the last. This may take place in such a degree that the central lacinia, or even those next to it may become obliterated, and this is partly (perhaps) the case whenever the number of teeth is less than 5.

The centripetal development is so strong, that the outer half of a lacinia may become ligulate, and the inner not, so that any amount of irregularity as to the number and size of teeth may be expected in a ligulate corolla.

A ligulate corolla can only occur in a flower with strictly valvate æstivation, and its great prevalence in the order, is a proof of the constancy of this æstivation, and consequently its value as a character. Why the corolla becomes unilabiate is another question, it may arise from the pressure which growth in any other direction than outwardly, may be supposed to be subjected to, and this idea is somewhat corroborated by the frequent limitation of ligulate corollas to the circumference of the flower. Then the question arises, why does it happen, that one grand division of the order is cha-

racterised by having all its flowers ligulate. This is a question worthy of examination, for it appears to my limited experience, that in both those tribes which are characterised by having entirely regular, or entirely labiate flowers, that the amount of pressure due to the structure of the involucrum is greater than in the third or mixed tribe.

It must not be overlooked that the degree of development of ligulate flowers, is in the ratio of their distance from the centre.

The maximum growth is in most cases around the cercumference; take for instance Centaurea, and this may also be looked upon as an evidence in favour of the general tendency to produce ligulate circumferential flowers. This tendency is very evident in Calendula vulgaris, in certain specimens of which, but very few flowers in the centre of the disc remain unchanged, and it is equally so in a vast number of others, in which, although the flowers of the circumference are less developed than those of the centre, yet there is an obvious tendency to become unilabiate. The two lacineæ that in Calendula take on the irregular growth are the two nearest the axis, and it appears to be a condition, and indeed one without which the lip would have a reversed directions, that while they continue entirely distinct from each other, they cohere more or less with the teeth nearest to them. Thus whenever a lacinea is wanting, it is the 5th.

The tendency to ligulation is always accompanied by a higher degree of coloration. Thus in Calendula, the first change that takes place consists in the laciniæ nearest the axis, or their inner halves with respect to the axis, assuming an orange, in lieu of their original yellow colour.

Granting the tendency to separation between these two laciniæ, and a tendency to adhesion or even obliteration of all or part of the others, the corolla must necessarily become more or less unilabiate, particularly when combined with a certain extra development.

In all cases where ligulation is not the essence of the formation of a compound flower, it is accompanied by a reduction even to total obliteration of the stamina, an argument in favour of the affinity in nature, between the stamina and petals. This is particularly evident in Calendula vulgaris, in which the slightest tendency to ligulation is accompanied by abortion or at any rate, want of power in the male organs. And hence perhaps this tendency to ligulation may almost be expected to be greater in those plants of the order, in which the ligulate florets of the ray are entirely neuter. This is also pointed out by certain regular flowered genera such as Centaurea, in which the extra development of the radiate flowers is associated with loss of sexual power, but it is not only the actual over-development that is attended with this effect, but also the slightest tendency to unilabiate flowers in a host of Corymbiferæ.

Von Buch's theory is too partially supported by facts to entitle it to be adopted in so general a matter, as the production of ligulate flowers in Compositæ.

In Cichorium* there is a singularity connected with the anthers, from the midrib of each of which, a remarkably fine membrane is produced, which contracts a firm adhesion with the similar productions of the antheræ of either side; along the line of union is a dark line simulating at first sight a line due to vascularity; these membranes are quite distinct from the other part of the anthers. They are produced only from the connection of the polliniferous portion of the anther. See Pl. CCCCLXVI. Fig. *d*.

The structure of the base of the style is only in excess of that which occurs in all truly adhering calyces, and is I consider, evidence of a tendency to produce additional stamina, the quantity of this glandular substance varies much; in Cichorium, it is highly developed.

* Cichorium resembles very much in habit, certain forms of Campanulaceæ.

There is a tendency even in genuine Carduaceæ to irregularity of the flowers of the circumference, hence the question, which is the typical form of Compositæ? Is it that in which this tendency is carried into full effect, as in Ligulatæ, or is it that which possesses the greatest regularity, and consequently that in which it is least worked out, as Carduaceæ etc., or is it that in this which general tendency is executed, as well as another less general—namely, the tendency to regularity as we approach the centre—*Corymbiferæ*. This question can only be decided by examination of the whole order. I am almost persuaded that there are three types of formation of different value, which will be found to pass into each other at various points to a greater or less degree. These types are pointed out by structure, as well as by sensible properties, or the want of these, which last occurs in Carduaceæ or Cynarocephalæ, while Ligulatæ are milky, and Corymbiferæ very generally aromatic and glandular.

In a species of Carduus from Candehar, the florets in a very young state consist of a calyx with a rudimentary toothed limb, a valvate corolla nearly partite to its base, and 5 smaller similar bodies, the rudiment of the anthers. Traces of a female organ are evident, in the form of a small central projection, but no ovulum, see Pl. CCCCLXVI. Fig. h. The development appears to be equal except as to pollen, which is of late formation.

The subsequent changes take place with too much rapidity to be observed in their several stages.

The stigmata of Anthemidea 638,* or rather the stigmatic surfaces of the branches of the style are peculiar, and rather incompatible with the idea that the stigma is the denuded apex of the midrib, for it is plain, that the stigmatic surfaces are confined to the margins of each branch, these becoming confluent and very distinctly papillosæ at the apex Pl. CCCCLXVI. Fig. *c*.

* Itinerary Notes p. 273.

To reconcile this with the actual idea of a stigma ; we should have to assume, that the stigmatic surface was least developed at the spot from which it is said to originate, because the papilla are more developed on the sides of the apex, than on its centre, and then again to assume its decurrence down the style. Such an idea of the structure and origin of the stigma, sets out with the improbability, that from the most fibrous and the most dense portion of the structure of an ovarium, the most cellular and the most lax portion should originate. Considering the stigmatic surfaces as productions from the placentæ, we obviate these difficulties, and more, we render every apparently anomalous instance capable of easy and direct explanation. If that portion of the ovarial leaf which forms the style be spread out, or is otherwise not involute, the stigmatic surface will be external, it may be either marginal as in the instance alluded to, or it may, by mutual adhesion, occupy the whole inner surface.

If the style be involute to that degree that its outer edges are brought into juxta position, the stigmatic surface will occupy to a greater or less degree the centre of the canal so formed. Were the stigmatic surface to orginate from the apex of the midrib, it could not have such relations to the placentæ as would insure the shortest road to the completion of fecundation, and in this point of view the theory is very faulty.

In this same plant there is an obvious attempt to form the rudiment of a calycine limb, while in some others (instead of such being the case) the base of the corolla grows downwards over the ovary. Pl. CCCCLXVI. Fig. *g*.

In Carthamoides 639*, there is a tendency to abortion in the famale part of the flowers of the ray ; the stigmata being comparatively small. Even in the disc, the branches of the style are firmly united and papillose over all their exposed surfaces, except towards their apices, which are smoothest, and

* Itinerary Notes p. 273.

on which the true stigmatic surfaces are somewhat indistinct. The anthers have the peculiar fine connectival membrane, and the stuposity towards the apex of the filament. The cessation of the vessels at the commencement of the peculiar structure is evident, as well as the nature of this peculiar structure itself, which is built up of short quadrate cells.

In Centaurea 640*, the connectival membrane exists, the structure of the stamine is very much the same, but there is no stuposity, the glandular disk is much developed while the base of the style is not bulbous, the curvature of the corolla in Carduaceæ is worthy of notice, for it is very common.

Affghanistan, May, 1840.

Elephantopus.

***Elephantopus* sp.**

Herbacea spithamæa, hispida, fol. rosacea patentibus ad bases caulim confertis oblongis, subsessilibus repandis, serratis basibus dilatatis ciliatisque, summis subintegris intermediis lyratim 2-3 divisis, floribus capitatis, capitulatis terminalibus, foliis 3-5 cordatis concavis involucratis.

Anthod. imbricat. squamis subscariosis lanceolato-linearibus pilosis, exterioribus brevioribus acutioribusque pauciflorum. Flosculis tubulosis, hermaph. Cor. tubus gracilis filiformis, limbus profunde 5-partit. laciniis linearibus erectis marginib. leviter inter se cohærent. (ideoque flosculus clavatus videtur) filam. fauci inserta. Anth. membranaceæ inclusæ. Stylus filiformis bifidus. Stigmata 2 inclusa pilosa conniventia. Ovar. pilos. Pappus plumoso-aristat. aristis 5, basibus dilatatis interdum incisis, ovulum 1 erectum.

Hab. In arenosis Mergue: *Nov.* 1834. *No.* 710.

Pollen globoso-album areolatum. Corolla limbus rosaceus, Styli basis ampliatus articulatusque, aristis minimis raris,

* Itinerary Notes p. 273.

aliis interjectis, venis apices lacinear. callosus attingunt sed nec reflex. secus lineas medialis. Receptaculum nudum.

An eadem cum no. 506, ob stationem parva, incompleta-que.

Erigeron.

1. *Erigeron* sp.

Herba erecta annua ramosa pilosa, fol. inferioribus obovatis in petiolum attenuatis, lobato-dentatis, cæteris oblongis eodem modo divisis, basi cordatis et semiamplexicaulibus. Capitulis subnutantibus axillaribus, solitariisque vel terminalibus paucis, terminali prius evoluto.

Torus saltem externe vix evidens. Involucra e squamis pauci seriatis, imbricatis linearibus apicibus membranaceis coloratis.

Flosculi radii ligulosi, fæminei disci tubulosi. Radii multi-seriati, seriebus extimis tantum radio donatis, cæteris mere tubulosis, ore obliquo papilloso. Tubi angusti filiformes. Radii angustissimi rosacei, obtusiusculi bivenii, venis lateralibus infra apicem evanidis. Ovaria ovata pubescentia, pilis hyalinis apice ramosis, infra apices constricta. Stylus filiformis, tubo $\frac{1}{3}$ longior. Stigmata linearia lævia.

Pappus, 1-seriatus setaceus, crebre alterne dentatus. Receptaculi inter flores producti in processus dentiformes brevis, disci multo majores.

Flores disci tubulosi hermaphroditi, tubo fæmineis breviore, fauce ampliata, limbus, 5-dentata æstivatione valvata venatio Brunnonian, vena decurrente nulla, v. apicibus approximatis clavatis, filamenta facile solubilia crassiuscula.

Antheræ ovato-oblongæ, leviter cohærentes, connectivo in apiculo brevi producto. Pollen globos. hispidulum. Ovaria.?

Stylus filiformis crassior et brevior ac in fæmineis, stigmata 2 multo longiora, papillosa.

Pappus subplumosus, dentes nempe plurimæ majusque evolutæ.

Ovula in utrisque eadem, in disci paulo minora, an fertilia? Raphe ad apicem seminis currens, saltem post evolutionem saccula embryoniferi.

Hab. Assam. In arenaceis. Burrumpootur a Suddya ad Bishenath, *no.* 436.

Facies Erigerontis pappus radii valde conspicuis, ovula ad epochum evolutiones primæ embryonis cum pericarpio firme connata, raphe demum completa. Pl. CCCCLXVI. Fig. *e.*

2. *Erigeron* sp.

Herba annua erecto-villosa, fol. alternis sessilibus panduriformibus dentatis basi profundiusculi-cordatis. Cymis pauciflоris dichotomis divisconibus 1-3 capitulatis, centralibus prius evolutis.

Capituli subglobosi. Involucr. imbricat. squamarum marginibus scarioso-membranaceis.

Receptaculum centro planum dentatum, marginibus convexis papillosis heterogamum.

Flosculi radii numerosiss. multi-seriati, fæminei radiati, radio abortivo, tubo gracili ore obliquo cellulis papilloso vel piloso. Stylus longiuscule exsertus, stigmata approximata angusta minute papillosa.

Disci pauci tubulosi, albidi, os versus ampliata 5-fida æstivatio valvata; v. Brunoneano, v. recurrente 0.

Stam. fauci vel initio ampliationes inserti. Anth. basi simplices apice apiculatæ. Stylus basi parum dilatatus, insertus cyatheforme in disco epigyno. Stigmata latiusculi lanceolata valide papillosa. Ovarium ovato-oblongum, apice punctatum pubescens constrictum, ore calycino tunc dilatato integro obsoleto. Papus 1-serratus dentatus flores subæquans.

Ovula vix sine laceratione solubilia, raphe normalis saltem post evolutionem sacculi embryoniferi chalazaque punctiformi apiculi.

Akenia immatura, compressa albida collo valide contracto, corona annuliformi pappum gerens, pubescentia rugosuloque punctata. Tegumentum exterius ovario arcte adnat. nux sine laceratione solubile, interius embryonem orthotropum arcte vestiens (certe original e sacculo embryonifero.)

Hab. Assam. In arenosis Burrumpootur: *March* 27, 1836. *no.* 456.

Vix differt a numeris (1) 436, et (3) 442, generice non nisi radiis omnino obsoletis, raphique normali nec completa, raphe nullæ in ovulis junioribus.

3. *Erigeron* sp.

Herba erecta 1½ pedalis basi ramosa hirsuta, fol. alterna obovata saltem inferiora, superior oblongo-lanceolata sessilia, dentata. Capituli parvi inconspicui cymosi. Cymis subcorymbosis terminalibus axillaribusve, capitulis interioribus primo evolutis a peripherio ad centrum.

Invol. imbricat. squamis linearibus apice coloratis et membranaceis.

Flosculi radii saltem extime ligulati, cæterum ligula obsoleta, ovaria ovata compressiuscula, pilis uncialis pilosa.

Pappus crebre dentatus, corollam excedens. Tubus gracilis filiformis, ligula angustissima rosea, oribus papuloso-cellulosis. Stylus tubo duplo longior. Stigmata 2 filiformia papillosa, Corollæ basis annulum in capit. ovarii attenuato formans, ligula evasculosa.

Disci pauci infundibuliformes, 5-fida, venatio Brunon. vena decurrenti 0.

Antheræ oblongæ, connectivo apiculatæ cohærentes. Stigmata ovata.

Ovula: ovario adnata, iterum examinanda.

Hab. Assam. In arenosis Burrumpootur: *March* 23*rd*, 1836. *No.* 442.

Ejusdem generis cum, *no.* 436.

Spæranthes.

Spæranthus.

Herbacea ramosa decumbenti-prostrata, pubescenti-viscosa, fol. decurrentibus oblongo-lanceolatis dentatis serratis, serraturis aristatis. Capitulis sphæricis ovato-globosis rubris.

Axis conica, obtusa, medio lacunosa. Capitula composita e glomerulis indefinitis discretis subsessilibus extus involucellatis, squamis oblongo-linearibus 1-seriatis plus minus scariosis pilosis ciliatisque.

Floribus heterogamis, exterioribus 1-seriatis, sub 10 fæmineis, interioribus 3 hermaphroditis. Radii tubulosi, sub-irregulariter 3-fidi, ore haud obliquo. Stigmata subulata, subexserta. Disci tubulosi multo majores, sæpius 4, ore parum ampliato 5-fido, venatio Brun. vena recurrente 0.

Stam. totidem alternantia. Filam. filiformia una basi corollæ inserta. Anther ovato-oblongæ simplicis vel nec appendiculatæ. Stylus exsertus basi bulbosus vasc. fasc. basi etiam discretis ad anthesin cito elongatus $\frac{1}{3}$ superior pilosus. Stigmata 2 brevia ratione fæminearum approximata. Pollen globos. hispidum. Ovaria teretiuscula pilosa, ovula erecta libera, raphe 0.

Hab. Assam. In arenosis Burrumpootur : *March 25th*, 1836. *no.* 450.

Squamis conformis unica capitulas. Inflorescentia spicæ centripeta ut etiam capitulosa ? vidi semel stigmat. tria vasc. fascic. 3 stylo, quorum 2 approximata quamvis discreta.

Char. Capituli dense spicati, pauciflori heterogami, bractea unica suffulta ; squamæ scariosæ, ciliatæ, biseriatæ.

Flosculi tubulosi, radii fæminei, disci sub 4 hermaphrodit. Filamenta basin corollæ inserta ! Pappus 0. Styli hermaphroditi pilosi.

Obs. 1. This overrules DeCand. sections, as it belongs to his Eusphæranthus, although the axis is hollow, see Wight's Contr. p. 11.

2. The characters of Jussieu and Sprengel are both erroneous, although Jussieu's is far the best, as there is only one scale which does not separate with each capitulum, and as it is inferior to each, it is certainly a bractea, and belongs to the axis of inflorescence. All the rest are referable to the capitula. There is no common involucrum, at least more than resulting from the outermost bractea.

3. It is entirely a Corymbifera, its peculiarity being the aggregation of its capitula.

CONYZA *Juss.*

1. *Conyzæ* sp.

Herba annua erecta bipedalis cano-villosa, foliis alternis obovato-spathulatis sessilibus runcinatis dentatisque vel dentatis et repandis.

Cymis axillaribus terminalibusque pluri-capitulatis, subdichotomis capitulis nutantibus, centralibus prius evolutis subcylindraceis medio angustatis.

Involucr. imbricat. pluriseriatum.

Receptaculum planiusculum, favulosum, heteroganum. Flores radii multiseriati fæminei tubulosi, interiores magis evoluti ore dilatato 3-fido, laciniis papilloso-cellulosis. Stigmata linearia exserta angusta minute papillosa.

Disci pauci tubulosi lutei, faucibus paululum ampliatis 5-fidis, æstivat. valvati, vena excurrente nulla. Stam. infra medium tubo inserta. Anth. basi apiceque appendiculatæ, appendiculis basi setiformibus apicis plano-subtruncatis.

Stylus basi bulbosus, stigmata 2 subexserta, valide papillosa. Ovaria cylindracea, pubescentia. Pappus dentatus simplice serie, os calycis simplex obsoletusque. Raphe ad epochum fecundationes seminis apicem vix attingent.

Akenia subimmatura oblongo-cylindracea vix compressa pubescentia.

Testa pericarpio adnata et vix sine laceratione solubilis raphe normalis.

Tegument. interius embryonem arcte vestiens, utrinque apiculat. Embryo ordinis.

Hab. Assam. In arenosis. Burrumpootur: *March 29th*, 1836. *no.* 458.

Capituli axin totam terminantes racemosim dispositi. Color. griseo-canus, flosculor. luteus.

2. *Conyzæ* sp.

Herba erecta 3-4 pedalis, fol. alterna sessilia lanceolata, deorsum attenuata acuminata inequaliter dentato-serrata, rigida, subtus pubescentia longitudine 8 unciali, latitudine extremâ 2 unciali, venis secondariis sursum curvatis, apicibus gradatim attenuatis et evanidis intra marginem.

Paniculæ axillares terminalisque conico-pyramidales maximæ maximeque compositæ, pubescenti-villosæ. Ramulis bi-tri-floris, capitulo terminale prius evoluto. Pedicellis sub 3-bracteolatis.

Involucrum cylindraceum basi ovatum multiplici serie imbricatum.

Receptaculum convexum, tenuissime setaceo-pilosum, beterogamum.

Flosculi radii plurimi, multiseriati, fæminei tubulosi, tubo gracillimo longo, ore conformi 3-fido, laciniis dorso pilis capitato-glandulosis maximis paucis gerentibus. Stylus filiformis.

Stigmata angustissima linearia subexserta.

Disci paucissimi sub 10, hermaphroditi tubulosi sursum gradatim sed paullulum ampliato 5-fidi, laciniæ glanduloso-piliferæ et parce piliferæ, æstivatione valvatæ, venatio Brunoniana, v. recurrenti 0.

Stam. tubo basin ejus versus inserta. Antheræ utrinque appendiculatæ, appendicula apicali, plana truncata, basilare setiforme. Pollen globosum hispidum, pluri (3) seriatum. Ovaria teretiuscula pubescentia apice glandulosa, ovula libera, (ordinis) raphe ad epochum florescentia semi vel $\frac{2}{3}$ completa apicem nempe non attingenta.

Discus epigynus mediocris. Stylo basis vix dilatata. Pappus sessilis 1-seriatus, setaceus dentatus.

Pili receptaculi tenuissimi, septato cellulo terminale longissimo.

Akenia oblonga vix compressa, brunnea striata, pubescentia, basi callòsâ umbilicatâ perforatâ, apice glandulosa.

Testa pericarpio adhærens, non sine lateratione solubilis. Embryo ordinis.

Hab. Assam. Seloni Mookh in umbrosis: *April 5th*, 1836. *no.* 475.

Stigmata hermaphroditorum conformia fæmineis sed majoribus. Contusa graveolens. Secus Sprengelii enumerationem Gen. Plant. Vol. 2, p. 618, vix alii generis quam Gnaphalii.

Valde affiinis sp. (1) 458, p. 227, sed differt. receptaculo piloso. Conyza Juss. Gen. 180, non obstante receptaculo piloso.

Blumia.

Blumiæ sp.

Fructus raminus, pedunculo unciale robusto insidens, subspæricus lignosus, areolatus, exareola quaque spina angulata echinata, 5-locularis, loculicidim 5 valvis, valvis septisque aurantiaceis, crassis.

Semina cujusque locula 2, 4, angulo interiori basin loculi versus affixa, ascendentia oblonga, subclavata, castanea funiculo succulento luteo fere arilliformi insident. each making an indentation in the inner face of the valve.

Raphe $\frac{1}{2}$ complete ramis e chalaza ortis dichotomis sæpius, integument. ramificantibus.

Tegumentum crassum, medio osseum, albumen carnosum copiosum. Embryo carnoso oleosum.

Radicula infera.

Cotyledones planæ foliaceæ ratione albuminis obliquæ.
Sent to me from Malacca, found on Puloh Ladong.

Eclipta.

1. *Eclipta.*

Annua prostrata hispida, pilis adpressis, fol. opposita! linearia lanceolata, serrato-denticulata. Capituli bini pseudo-axillares, pedunculati, interiori caulem vero terminali prius evoluto, exteriori vero axillari, axilla folii oppositi ramum caulis prolongationem mentiente gerent.

Involucr. sub 3-seriat. squamæ foliaceæ lanceolatæ interiores minores, demum radiantia initio ascendentia.

Flosculi radii ligulati, disci tubulosi, utriusque fertilis, his nempe fæmineis illis hermaphroditis. Receptaculum convexum, setas plumosas gerens.

Fl. disci fæminei, tubus gracilis, ore hinc piloso, cellu-loso, limbus linearis obtusus integerime bifidusve.

Stylus filiformis basi non dilatat. tubo duplo brevior. fasciculis vasculosis 2. Stigma 2. Ovaria compressa apicibus viridibus subconicis truncatis.

Raphe ad epocham evolutionis saccula embryoniferi brevis, ovulo triplo brevior.

Disci infundibuliformes, tubo brevissimo, laciniis 4 papillosis, æstivatione valvatis.

Stam. 4 inclusa, (sed nec tubo) antheræ ovatæ leviter cohærentes. Pollen globosum hispidum. Stigmata 2 latiora ac in fæmineo.

Ovarium idem, Venatio Brunonian, venula decurrenti nulla, v. apicibus clavatis, conniventib. sed nec contiguis.

Akenia compressa, alba, cellulosa, marginibus incrassatis, calycis limbo angustato denticulato coronat. apice pilosa.

Pericarp. atrum duram coriaceum rugosulam hispidulæve

akenio adnatum. Semen liberum testa tenuissima simplex, elevato-punctata.

Embryo albus, orthotropus radicula conica, cotyledonæ oblongæ.

Hab. Assam. In arenosis Burrumpootur: *March 23rd*, 1836. *no.* 441.

2. *Eclipta.*

Involucr. imbricatum subbiseriate, foliolis lanceolatis, 1-nervus, reticulatis exterioribus majoribus interiora superantibus. Flosculi radii ligulati fæminei, disci tubulosi hermaphroditi.

Flos. radii tubus brevissimus, limbus lineari-spathulatus subinteger irregulariterve bifidus, faux partis tubulosæ extus quoad axis setas 2-3 gerens. Stylus vix exsertus filiformis, stigma obsolete emarginatum.

Ovaria angulato-clavata apices versus viridia idemque setigera. Pappus obsolete 4-5 dentat. dentibus breve mucronatis, ovulum cuneato-oblongum erectum.

Ovaria florum disci omnino conformia. Cor. campanulato-infundibuliformis tubo augustato, limbo 4-fido laciniis erectis ovatis papillosis. Stamina fauci tubi inserta, tot quot dentis corollinæ et iis alternantis, filam. filiform. Antheræ oblongæ leviter cohærentes bilocul. Stylus filiformis semi-exsertus. Stigmata 2 recurva. Clinandrium, setis aristisve ciliatis subpinnatis donat.

Akenia cuneata compressa ad apicem setosa marginibus cellulosis albis obtuse dentatis, angustatis. Pappus obsoletus denticulatus. Pericarp. atrum rugosulum. Testa membranacea tenuissima vix separabilis. Radix conica. Cotyledones ovules obtusæ. Plumula 0.

Herba decumbens hirsuta. Petioli basi dilatati connati, folia ovata vel lanceolata dentata. Capituli axillares vel in dichotomiis caulis sito plerumque geminati, corollæ albæ.

Hab. Bengal on the Jellinghey river: *Sept. 6th*, 1835.

Xanthium.

Xanthium indicum.

Annua herbacea erecta ramosa pubescentia pilosa, caulibus ramisque purpureo-maculatis, fol. longe petiolatis cordatis sinuato-lobatis, grosse dentatis, basi 3-nerviis, tactu scabris.

Inflorescentia terminalis paniculatis, mascula in capitulis subconicis densifloris, superior. fœm. solitariis basin versus paniculæ abbreviatæ, flores inconspicui viridescenti.

Mas. capituli bracteati, bracteis (infimis involucrum formantibus), lanceolatis pilosis.

Per. tubulosum 5-dentat. dentibus erectis basi albida, parce pilosa æstivatione valvatis. Stam. 4 hypogyna, filamentis in tubum filiform. omnino coalitis, apice exsertus. Anth. erectæ oblongo-lineares magnæ biloculari, liberæ, membran. longit. dehiscent. introrsæ, connectiv. ultra loculos paulum producte. Pollen album magnum globosum læve. Rud. fœm. Stylus filiformis. Stigma papillos. intra tubum staminum reconditum.

Fœm. involuc. 6-7 phyllum, foliolis bracteis marum conformibus demum deciduum. Per. tubulosum, apicem constricte perforat. pubescens, pilis foritibus uncinatis armatis, ovaria 2 includens, e 2 nempe format. Stylus filiformis, stigmata 2 linearum longiss. e perforationem perianth. exserta. Ovar. 1-loculare, 1-ovulat. ovulo erecto foramen hilum prope.

Fructus perianth. nudum ovato-lanceolat. pubescens, pilis uncinatis armat. apice biapiculat. quam maxima indurat. fere osseum biloculare, loculo quoque akenia unam gerente.

Akenium styli basin apiculat. nigrescente. Tegument. duplex utrinque tenuissimum membranacea, semen erectum exalbuminosum. Embryo orthotropus radicula conico-subacuto infera. Plumuli conspicui, 2-phylla, foliolis involuto-conduplicatis; Cotyledones carnosæ, plano-convexiusculi.

Hab. In ruderatis humidis Mergue: *March* 1835. *no.* 1095.

Venatio *Brunoniana*, odor Compositarum! antheræ dentibus perianth. opposit. ? stipulæ 0.

Differt. e Synantheriis, filamentis connatis, antheris liberis, akeniis liberis, perianth. fæmineis. Plura Urticearum.

Bidens.

Bidens.

Caulis quadrangulus oppositis petiolatis imis simplicibus reliquis 3-foliatis, foliolis ovatis basi obliquis dentato-serratis.

Involucrum imbricatum, squamis sericea exterioris foliaceis, initio erectis cæteris scariosis æstivatione conniventi-incumbentibus, heteroganum.

Flosculi radii pauci ligulati fæminei, tubo brevissimo ligulata obovata inæqualiter 3-dentata, dentibus mucronatis ore nudo. Venatio Brunoniana, venis etiam axilibus valide conspicuis textura ambiente lutea, nullo modo anastomo santibus cum venulis lateralibus.

Disci nunc basi tubulosi 5-fidi aurei, lacinia 5ta ut in aliis antica æstivatione valvatis tubo brevissimo nempe basin supra paullo ampliato, (suddenly) venatio Brunon. *v.* apicibus confluent.

Stam. parte ampliatæ initio inserta. Anther. basi simplicis apice conspicue appendiculatæ, appendicula lanceolata.

Stylus basi attenuatus. Stigma valide papillosa aurea. Ovaria cylindraceo-angulata ore calycino simplice denticulato hinc utrinque in setam retrorso-denticulatam setæ rarius 3, corolla $\frac{1}{2}$ breviorem product. Ovula libera raphe incompleta.

Receptaculum paleaceum. Discus florum disci valide evolutus hinc fissus sub 5-dentat. dentibus filam. alternant. Pollen globosum hispidum.

Akenia ?

Hab. Assam. In arenosis. Burrumpootur: *March* 30*th*, 1836. *no.* 460.

A Sprengelia inter Eupatorinas perfectas locatus, sed vix recta. Processus 2 an plures ad stant. ore ligulatorum, an stamin. rudimenta? Florum ovarium solidum.

Cotula.

1. *Cotulæ* sp.

Prostrata ramosa piloso-pubescens, fol pinnatifida ambitu ovata, capitula solitaria, terminalis pedunculata. Torus exterior nullus, capitula basi concavâ.

Invol. biseriat. squamis foliaceis, oblongis. Receptaculum conicum, medio lacunosum nudum.

Flosculi breviter pedicellati, diffórmes, disci hermaphroditi tubulosi, 4-5 fidi; radii tubulosi, fæminei limbis irregulariter 4-5 fidi multo minoribus.

Akenia (immatura) cellulosa compressa glanduloso-pilosa. Calycis limbo urceolato dentato, dentibus setigeris coronata. Tegument. tenuissimum, e 2 connatis, exterius masses grumosas continens. Embryo orthotropus, cotyledones ovates radiculum brevem superantes.

Venatio Brunoniana v. decurrente 0. Stigmata flosculorum disci ovata, duplo angustiora et magis papillosa quam radialibus. Æstiv. valvata. Pollen globosum. Fl. disci serius evoluti.

Hab. Assam. Burrumpootur: *March 22nd*, 1836. *no.* 437.

Videtur esse Cotulæ species.

Raphe demum tantum formatum, et circa apicem producta, forsan completa. In ovaria immatura ovula leviter coadnata sunt.

2. *Cotulæ* sp.

Herba annua pussilla ramosa basi prostrata. Caule lanato dichotome diviso, fol. spathulato-dentata sessilia. Capitula inconspicui sessilis vel breviter pedunculati hæmisphærici.

Involucrum ratione capituli minimum, e squamis oblongo-spathulatis marginibus membranaceis biseriatis. Receptaculum nudum convexiusculum.

Flores difformes, disci tantum corolla completa donato. Radii fæmineive plurimi, ovariis pilosis compressis, calycis limbo truncato nudo. Corolla tubulosa apice nec dilatata, minute 2-4 dentato, ovaria aliquoties (3-plo) brevior.

Stylus longitudine corollæ, stigmata 2 ascend. Ovulum 1 basi affixum, raphe ad epochum evolutionis embryonis vix evidens.

Disci : calycis limbus 5-dentat. dentibus parvis petalis alternant. Tubus corollæ brevis, limbus 4-laciniatus, laciniis patentibus, æstivatione valvatis, venatio Brunon. laciniar. vix conspicue certe irregularis. Stam. totidem antheræ leviter, cohærentes basi sagittatæ. Stigmata ovata breviæ papillosa. Stylus filiformis basi paullo dilatatus.

Tegument. seminum immaturor. e membranis 2 tenuibus quarum exterius lutescens. Embryo orthotropus. Raphe nulla, sublentem $\frac{1}{20}$ non conspicue. Pl. CCCCLXVI. Fig. *i*.

Hab. Assam. In arenosis, Burumapootra: *March* 23*rd*, 1836. *no.* 440.

3. *Cotulæ* sp.

Herba annua erecta ramosa hirta, fol. alternis sessilibus obovatis duplicato-dentatis, cymis axillaribus et terminalibus, capitulis hæmisphæricis inconspicuis, centralibus primo evolutis.

Involucr. ratione capituli parvum, subbiseriat. squamis lanceolatis apice fimbriatis.

Receptacul. nudum convexum. Flosculi disci tubulosi hermaphrodit. radii fæminei.

Radii : corolla conica cellulosa, apice 3-denticulata. Stylus hujus longitudine. Stigmata subexserta minima. Calycis limbus obsoletus, obsoleto-dentatus. Disci : infundibuliformes, 4-5 dentati æstivatione valvati, series evolut. 0. decurrente nulla.

Antheræ leviter cohærentes apiculatæ. Stigmata lanceolata *majora*.

Ovaria disco obovata, relique ovato-oblonga glabra, ovulis cohærentia.

In arenosis Burrumpootur: *March* 23*rd*, 1836. *no.* 443.

Ejusdem generis cum precedent. *no.* 440.

4. *Cotulæ* sp.

Planta annua, ramosissima, ramis busi decumbentibus, fol. alterna bipinnatifida, laciniis angusto-lanceolatis. Capitulis *terminalibus* binis solitariisve, hoc casu exterior prior evolutus, caulem terminat. interior vere axillaris est.

Involucr. imbricat. *triseriatum*? radiatum, serie exteriore aliquoties majori, squamis lanceolatis. Receptaculum paullo convexum, lacunosum, centro læviusculo externe tuberculat.

Flosculi radii fæminei, disci pauci hermaphroditi tantum corollato completi.

Radii plurimi, breviter pedicellati, a petali! Calycis limbus irregulariter 3-denticulat. Stylus filiformis, stigmata 2 angusta.

Disci infundibuliformes, tubo cylindrico-4-fidi laciniis æstivat. valvatis.

Antheræ apiculatæ. Stigmata lata exserta, stylo nempe hinc extrorsum quoad corollam flexo.

Ovaria glandulosa, calycis limbo obsoleto.

Ovula ovario adnata, Akenia oblonga compressa, calycis denticulato limbo coronata albo-cellulosa compressa marginibus incrassatis, radii stylo apiculat. Testa pallide brunnea subsimplex, membran. tenuiss. Embryo ordinis.

Hab Assam. In arenosis, Burrumpootur: *March* 23*rd*, 1836. *no.* 444.

Quam maxime affinis quoad genus præcedenti an satis, differt. Flosculis radii pedicellatis apetalis, et habitu. Receptaculoque extus vel ambitu versus tuberculat. (tuberculis a pedicellis ortis.)

5. *Cotulæ* sp.

Herba 4-5 uncialis, caulibus decumbentibus radicantib. ramosis superne flocculosis, foliis sessilibus spathulato-obtusis, dentatis. Capitulis solitariis axillaribus, fere sessilibus hemisphæricis. Invol. polyphyllum imbricat.

Flores disci pauci masculi, radii fæminei. Cal. truncatus. Cor. tubo brevi limbo 4-partit. Anth. 4 discretæ vix coalitæ, laciniis alternis, filam. fauci insertæ. Stigma capitatum bilobum.

Flos radii cal. truncatus, brevissim. 4-dentatus, corolla tubulosa, Anth. 0. Stigmata 2 brevia. Stylus filiformis. Ovarium extus pilosum. Ovulum 1, erectum. Akenia margine calycis truncata coronata pilosa.

Petalorum venatio normalis quoad ordo sed inconspicua.

Hab. In ruderatis, Mergue: *July*, *September*, 1834. *no.* 259.

Gnaphalium.

1. *Gnaphalii* sp. Pl. CCCCLXVII.

Planta spithamæa, sericeo-canescens. Ramis subradiatis lateralibus basi decumbentibus centrali erecto.

Folia linearia vel lineari-spathulata varia torta, summa circa inflorescentiam aggregata subverticillata.

Capitulorum aggregationes terminales, interdum ob elongationem rami ex axillis folii supremi unius tantum videntur lateratis. Capitulus quisque subovatus terminalis prius evolutus.

Squamis exterioribus laxis imbricatis subdistantibus vere spicatis, longe cuspidatis, cuspide reflexiusculo, carinato-concava margine membranam reflexo, dorso arachnoideis.

Intimis e cuspidatis, subglabris.

Receptaculum cæterum nudum.

Flores forminei, in axillis squamarum exteriorum constantes, ex ovario subglanduloso. Corolla anguste tubu-

losa, apice obsoliti 3-loba et stylo ordinario ramis exsertis. Flores squamarum interiorum pappigeri abortivi, stylo in tubo incluso.

Flores summi masculi, vere terminales? in receptaculo rugoso nudi an ob abortion. squamarum radii. Ovarium ut in floribus fæmin. abortionis. Pappus idem, dentatus Corolla tubulosa, apice 4-fida, venatio Brunoniana. Antheræ 4, basi et apice, appendiculatæ, medium tubi versus exsertæ, Stylus clavatus apice pubescens.

Fructus oblongus subcompressus, corolla in axillis squamarum exteriorum et stylo dentius persistente, hujus ramis forsan elongatis, glandulosum.

Seminis tegumenti unicum embryonarium solubile. Embryo ordinis.

1. Plant natural sige.
2. Head of inflorescence.
3. One of its component parts detached,
4. Portion of do. shewing the structure of the capitulum.
5. Portion of do. shewing the nakedness of the male flowers, the suffultion by a bracte of the remainder, and the change in structure in these as we proceed upwards.
6. Female flowers and its bracte, the stigmata are anterior and posterior.
7. Female flower detached shewing the want of pappus, and the small development of the corolla.

7*a*. Ovarium viewed under pressure.

a. Calyx, its wall glandular colored and furnished with two vascular facicles which send two branches into the corolla, and a corresponding number to the style.

b. Very fine evascular pure *membrane* which I consider to be the ovarial wall and which is detachable by pressure, although evidently attached to the base of the style, *c*. ovule.

8. Imaginary section of female flower not carried through the ovulum. I will not answer for the correctness of the situation of the ovule.

9. Abortive flower from the axil of one of the inner scales. Pappus well developed. Corolla badly so, dentate at apex, and enclosing within it an obscurely emarginate style.

9*a*. Imaginary section of do. not carried through the ovary.

10. Male flower. 11. Section of do. not carried through ovary. Pappus chiefly removed. The ovula of both such flowers, (9 and 10) are abortive, or rather come to nothing.

11. Anther back view of. Filaments evascular ! 10*b*. Pappus portion of.

12. Fruits. 12*a*. Same, corolla and Style lapsed, the branches of the style and their corresponding stigmatic surface appear to enlarge or elongate at least after impregnation.

12. Shews the structure of the coats of the akenuim, a genuine one in this instance although the inner coat is separable, *a* calycine coat, *b* embryonary sacculate, so that the ovarial coat, the testa, and nucleary coat have disappeared.

13. Section of fruit, *a* ovarial coat, *b* that derived from the embryonary sac, *c* embryo.

14. Portion of arachnoid threads.

Candahar: *May*, 1839.

Hab. Candahar Affganisthan, see Itin. Notes p. 272, *no.* 632. A tendency in Gnaphalium to have radiate ramification.

Obs. This is an interesting plant, in asmuch as it points out the tendency in the female flowers to be external, their tendency to be provided with bractes, to have no pappus, and small development of the corolla, and total abortion of male organs. It shews, that in such instances there is a gradual change of development towards the interior of the capitulus, those flowers which are provided with bractes and situated interiorly, being abortive and having pappus, but still without a trace of male organs. It shews that in some cases the male flowers are more

terminal than the female, and that the female organ is far more permanent than the male, since these are provided, with rudiments of females, indeed to a considerable amount of development.

The change of structure towards the apex of the filament appears due to a condensation of structure, no fibrous cells exist in the anther, which however dehised perfectly. The filaments are evascular. The venation of the corolla is Brunonian. The structure of the ovarium is very curious and merits further investigation. If the membranous separable inner coats be really the ovarium, it forms a transition to certain cases of Dipsaceæ and Scævoleæ, it affords a most anomalous instance of the possibility of the style being vascular, while the ovarium is evascular.

Of the structure of the fruit I have little doubt; the outer tegument of the akenuim appears to me to be calycine, the inner belongs to the embryonary sac, which there is some reason for supposing to be the most permanent coat of an ovulum, as it is the last in formation, its structure in Compositæ is peculiar, consisting of a single series of cells, each of which has a grumous nucleus.

There is considerable affinity, between this Gnaphalioideæ and the monocotyledonous-looking plant of the same order, from Abigoon, see Itinerary Notes p. 232, no. 231. And I may here mention that this transitionary appearance exists at its maximum, in a plant, which I suspect to be Roxburgh's Æthulia axillaris.

2. *Gnaphalii* sp. Pl. CCCCLXVIII.

Planta minima canescens radiati-ramosa. Folia ad basin caulis et subinflorescentias aggregata, linearia revoluta vel patent. Capituli compositi dense arachnoidei nivei. Partialis subrotundis, paucifloris. Squamis cymbiformibus marginibus approximatis et arachna dense quasi clausis, ore tantum obscure hiantibus, extimis minoribus 5 intimis subverticillatis radiatis, exceptis omnibus fæmineis.

Flos fæmineus e corolla angust tubulosa obscure 3-dentata, ovario glabriusculo, stylo stigmatibus ordinis, extimis abortivis.

Flores masculi discoidei pauci 3-4, terminalis squamis 5 intimis vacuis circumcincti; structu ordinario. Pappo pareo dentato. Antheris subinclusis.

Akenia recondíti in sinubus squamarum obovati, compressiusculi, lævia glabra tegument bina, exterius calycinum lutescens, interius grumoso-areolatum (ex embryones sacculo ortum) Embryo ordinis.

1. Plant natural size.
2. Capitulus single separated.
3. Same, some squamæ removed, the others separated, the 5 upper ones subverticillate somewhat spread out.
4. Another view the 5 upper squamæ as seen in the dry state: the arachne supposed to be removed, it shews the small development of the outermost squamæ and their flowers, the want of flowers to the verticillate ones.
5. Female flower and scale, which contains the whole of the flower, except the apex of corolla, and the stigmatiferous branches of the style. 5*a* Female flower.
6. Male flower.
7. Same spread open.
8. Portion of Pappus.
9. Anthera.
10. Portion of wall of its cell, the fibres rudimentary and quite wanting in the basilar appendages.
11. Akenuim, which is quite smooth.
12. Section of ditto. A calycine tegument. *b* Embyonary. *c* Embryo.
13. Portion of tegument of akenuim. *a* Calycine. *b* embryonary saccular.

Hab. Candahar: *May*, 1839. Vid. Itin. Notes *no.* 633, *p.* 272.

Obs. The chief points worthy of notice are the small de-

velopment of the outer scales and their flowers; the want of female flowers to the innermost ones, their verticillation and distance from the female scales, and relations to the male flowers, and the small development of pappus of these.

From *no.* (1) 632, it differs subgenerically at least in the above points except perhaps the first,

As the scales, which appear always to be 5, around the male flowers, although similar structure to those containing the female flowers are always empty, it is a point of enquiry whether the male flowers are developed in their axillæ or not. This I have been unable to do owing to the age and withering of the single specimen I have found. But as in (1) 632 there is an evident tendency in the innermost scales to have abortive female flowers, there is no reason why that tendency should not be complete in this instance.

The spicate inflorescence of the female, and the capitulate do. of the male, is well shewn in this plant, and judging from this we should not be surprised at finding a Composita with obviously spicate female flowers, and more or less distant, (perhaps involucrate) capitulum of males.

Is not the tendency to have the axis of inflorescence terminated by male flowers universal in the order. Are not the males of the really terminal capitulus more numerous than the lateral ones?

The vascularity of this plant is small, the marginal veins of the lacineæ of the corolla being obsolete, at least under a lens $\frac{1}{10}$ focal distance, the vessels of the fruit are very indistinct, and none? exist in the stamina. The stigmatose branches of the style are well developed in the male flowers and it would appear that in most such instances these branches are more papillose than the true ones.

3. *Gnaphali* sp.

Herba erecta ramosa lana parum conspicue vestita, $1\frac{1}{2}$ pedalis. fol. sessilia linearia, sinuato-repanda, mucrona sphacelato-acutata.

Inflorescentia vel ramos axillares vel caulem terminans dichotome. Capitulis aggregatis axin terminantibus prius evolutis ovatis.

Involucrum imbricat. squamis pluriseriatis scariosis late ovatis citrinis lucidisque, demum radiatis patentibus.

Receptaculum planiusculum, minute tuberculat.

Flosculi difformes. omnes fertiles, radii plurimi tubulosi filiformes, apice conformi, denticulati, fæminei. Stigmata inclusa angusta.

Disci pauciores, infundibuliformes, 5-fidi, hermaphroditi venatio Brunoniana v. lateralibus forsan incompletis. v. recurrenti 0.

Antheræ apiculo plano, basi sagittatæ. Stylus basi bulbosus.

Ovaria omnia oblonga teretiuscula, cellulis papillosa. Pappus dentatus ima basi quasi pectinatus. Tegument. semin. immatur. simplex. Embryo ordinis.

Hab. Assam. In arenosis Burrumpootur : *March* 22*nd*, 1836. *no.* 446.

4. *Gnaphalii* sp.

Herba crecta annua glanduloso-pilosum. Caule basi simplice fol. sessilibus, ambitu obovatis, alternis, runcinatis, lobis inæqualiter serratis, serraturis mucronatis summis lanceolatis, indivisus. Cymis axillaribus racemosim dispositis, cæteris. cymosim, corymbum terminale formant. Capitulis terminalibus prius evolutis, nutantibus subcylindricis.

Invol. imbricat. squamis difformibus, exteriorib. aristatis, arista simplice ramosave, glandula terminata ut etiam rami, reflexâ, interioribus coloratis scariosis erectis breviter acuminatis.

Receptaculum paullo convexum, favulosum solid.

Flosculi difformes, radii fæminei plurimum tubulosi elongati gracillimi, 4-dentati. Stylus exsertus. Stigmata papillosa linearia angusta lutea.

Radii hermaprodíti pauci tubulosi, apices versus dilatata ideoque subinfundibuliformes 5-fidi, laciniis marginibus cellulosis luteis, pilis cellulosis hispidis. venatio Brunon. v. recurrent 0.

Antheræ semi-exsertæ basi sagittatæ apice planæ. Stigmata exserta latiora ac in fæmineis. Stylus basi bulbosus.

Ovaria omnia pilis hirsuta. Pappus setaceus dentatus, 1-seriatus. Ovula libera, linearia, ordinis, raphe 0.

Akenia oblonga cylindraciuscula, striata hispida, disci coronata, disco epigyne truncato. Semen liberum, tegumentum simplex.

Hab. Assam. In arenosis. Burrumpootur: *March* 23*rd*, 24*th*, 1836. *no.* 447.

Genus distinct ob formam involucri squamarum exteriorum et aristis glanduloso-capitatis, alioque certe affinis præcedenti non obstanti habitu diverso, membrana tenuis akenii parietes vestut. An testa? hoc casu fructus non akenium sed carlyopsis erit. Ovula serius certe adnatum pericarpio.

5. *Gnaphalii* sp.

Annua spithamea, cano-lanata, fol. alternis sessilib. spathulatis dentatis capitulis, ovatis glomerulatis, glomerulis axillaribus terminalibusque, centralibus prius evolutis, fusco-griseis, basi lana involutis plerumque ternatum aggregatis: sessilibus ideoque spicæ compositæ.

Invol. subbiseriat. squamis scariosis fuscis, linearibus post anthesin deflexis.

Recept. minute tuberculat.

Flosculi difformes radii plurimi fæminei imperfect corollato. Corolla tubulosa ore conformi-dentato valde irregulariterque stigmata inclusa.

Disci pauci hermaphroditi infundibuliformes 5-fidi-venatio Brunoniana v. lateral incompletis vel nullis. Antheræ basi sagittatæ. Stigmata capitata! Ovaria oblonga teretiuscula pubescentia, libera raphe 0. Pappus setaceus dentatus 1-seriatus.

Akenia immatura teretiuscula, pilis cellulosis pubescentia subhyalina tenuissima.

Tegument. unicum liberum. Embryo ordinis.

Hab. Assam. In arenosis Burrumpooter communis : *March* 24, 1836. *no.* 449.

Stylus basi valide bulbosus vasculorum fascic. 2, basi styli coalita vel approximata. Pollen globosum.

Ejusdem generis cum precedent, *no.* 446.

Saussureæ.

Saussureæ sp.

Pedunculi apice incrassati. Involucrum ovato-conicum, imbricatum, squamis exterioribus parvis, apice processu triangulari cristatis, foliaceis interioribus multo longioribus coloratis, nudis.

Receptaculum convexiusculum, paleis setaceo-subulatis. integerrimis ! hispidum.

Flosculi hermaphroditi tubulosi. Tubo gracile sursum vix ampliato, lacinias 5 linearibus obtusis marginibus sublente modice augentis celluloso-crenatis, purpureo-rosaceis, v. recurrenti 0.

Antheræ exsertæ dimidium superius steril. processubus bases divisis, cellulosis. Stylus basi bulbosus.

Ovaria oblonga striata, annulo apice obsoleto.

Pappus plumosus decidius 1-seriatus basi connatus pilis longissimis simplicissimis. Ovula libera, raphe, anti anthesin nulla, post completa.

Akenia, oblongo-obovata compressa. irregulariter costata, brunnea, costis pallidis, coronata calycis limbo urceolata subintegro discoque epigyno *marcesco* conico.

Hab. Assam. In arenosis, Burrumpooter : *March* 23, 1836. *no.* 448.

An generice differt a sequent. *no.* 431, p.——involucra squa-

mis exterioribus processiferis, paleisque receptaculi e dentatis pappaque in hoc simplici. Pl. CCCCLXVI. Fig. *f*.

a. *b*. testa.

c. *d*. raphe.

e. nucleus.

Obs. In this the fruit is certainly a caryopsis, the teguments are two, both separating with the paricarp, to which the outer adheres firmly.

Pappus duplex exterior incompletus ? e squamulis truncatis minimis denticulatis, unilateralis an semper.

An Saussurea, of De Cand. ?

Cirsium.

Cirsii sp.

Herbacea erecta 1½-2 pedalis. Caule striato superne carnoso, fol. sessilia ambita spathulato-obovata, sinuato-pinnatifida. dentibus spinosis armata supra parce infra albo lanato-villosa, summis indivisis. Capitula solitaria, ramulos paucos terminantes. Pedunculi hinc illinc folia floralia linearia gerentis.

Involucrum imbricat. pluriseriatim, squamis lanceolatis, intimis subscariosis, omnibus apicibus coloratis plus minus reflexis, intimorum ante anthesin conniventibus subinflexisque, exteriorum apicibus subspinescentibus.

Flosculi plurimi omnes fertiles, tubulosim, tubo albo longitudinem involucri superanti, basi luteo exterioribus extrorsum curvatis, cylindricis, fauce tumida laciniis 5-linearibus angustissima radiantibus, carneo-purpurascentibus. Stam. 5 laciniis alternantia. Antheræ basi sagittatæ cohærentes eodem colore cum laciniis, apicibus anguste cuneatis. Stylus, filiformis. Pollen globosum hispidum ; stigmata 2, breviter pubescentia, tubo anthereo inclusa, arcte cohærentia.

Discus epigynus carnosus elevatus, in cujus apice stylus articulatus est.

Pappus plumosus, copiosus, biseriatus. Ovaria glabra alba, apice calycis margine crenulato intra quem pappus oritur coronata compressa, ovula 1 basi affixa, foramen hilum prope, raphe completa.

Receptaculum conicum, sursum inter flores in paleis piliformes dentatas product.

Hab. Assam. In graminosis, Bishenath: *March* 20*th*, 1836. *no.* 431.

Obs. The nucleus is united firmly to the integuments of the ovula, which appear to be two, the raphe is nearly complete, and evidently runs within the outer integument, and in the substance of the nucleus itself, it contains spiral vessels and disappears gradually within the lip of the foramen.

The structure of the paleæ is nearly the same with that of the pappus, with this difference that none of its peripherial cells are elongated into simple hairs.

Venatio Brunoniana venulam apice quasi clavatæ conniventes sed nec decurrentes, stigmata post anthesin exserta, Corollæ apicem versus primo marcescens. Sacculus in quo embryonem oritur, nec membranaceus ast e cellulis parvis formatur. Æstivatio valvata. Inflorescentia orthodoxa, flosculis centralibus nempe tardius expansis, vel flosculis gradatim a peripheria ad centro evolutis. Pl. CCCCLXVI. Fig. *a*.

Lactuca.

1. *Lactuca bialata* Gr.

Herbacea basi suffruticosa 5-6-pedalis tota glaucescens, succo lacteo læte. Caulis simplex crassus solidus. Folia alterna pendula indivisa lineari-ensiformia pedalia diametro trans. subuncialia, acuminata, sessilia, basin versus parce fimbriata dentata, cæterum denticulata, denticulis mucroniformibus ; vena infra prominula alte carinatâ, quasi triangulari-inerma ; supra planiuscula, medio longitudinaliter et obsole-

tiuscula cristata, v. secundariæ inconspicuæ oblique arcuatæ, pagina cæterum minute reticulata, cuticula infera stomatosa. Folia infima, marcescent. tortilia brunnea.

Axillis gemmiferis, gemmis superioribus postaram sæpe elongatis floriferis.

Panicula terminalis ramosissima longitudine pedalis vel sesquipedalis ambitu pyramidata, diametro transversal. pedali, erecta ramis quam maxima divaricatis, paucifloris, basi bractea lineari-subulata, membranacea suffultis.

Capituli terminales axeos primum evoluti, tuncque terminales ramorum, (more solito) inferiores cujusque rami racemosi, summi solitaria, vel potius rami basi compositi apice simpliciter racemosi, erectiusculi, pedicellas $\frac{1}{2}$ uncialis, bracteolis imbricatis squamiformibus fere omnino vestitos terminantis.

Alabastra exacti cylindiacea. Anthoideum apice excepto patente, etiam cylindraceum ; squamæ glauco-virides, marginibus albis, apice sphacelatæ dorso centraliter obsoleti-carinatæ obtusæ, extimæ ovatæ intermediæ sublanceolatæ, intimæ lineares apice patentes.

Flosculi omnes ligulati, intus pallide straminei, extus purpureo-obsoletissima tincti, ligulæ patenti-reflexæ, apice 5-dentatæ, dente centrali, profundiore sed minus elevato, venis interne prominulis striiformibus notate, dorso præcipue basis versus villosæ. Receptaculum scrobiculatum interstitus more conorum elevatis.

Tubus elongatus gracilis clavatus. ligulam subæquans apicem versus densiuscula villosus. Stamina fauci inserta. Antheræ lineares cohærentes, appendice apicali rotundato, appendicibus basilaribus binis setiformibus breviusculis, marginibus a medio supra ut appendix terminalis atro-brunneis.

Pollen l globosum flavum, majusculum hispidum. Stylus an pentahedrum filiformis, apicem versus hispidulus basi parum dilatatus, apice atro-tinctus ut stigmatum dorsa. Stigmata 2 revoluta, dorso hirta, ventre dense velutino hirtella.

Ovarium sessile, lageniforme, glabrum utrinque ala mem-

branacea integra venoso-striatum, more radiato, collo crasso viridescente.

Pappus copiosus sericeus, tubum longitudine vel paullo excedens, denticulatus, dentibus distantibus.

Ovulum unicum ovatum.

Discus epigynus insignis rotundata, depressa integer.

Hab. Assam : local name *Bone Afoo*, or wild opium. When *Kanee* or opium is scarce, the natives cut the stem into pieces, and soak bits of cloth in the milk, it has the same effect as opium, though it is not used now as that drug is so cheap in Assam, but in the days of the Burmese rule in that province, it was commonly employed.

In campis circa Suddyam ; floret *July* 1836. Lactucæ affinis indistinct obovaria bialata.

2. *Lactucæ* sp.

Annua pusilla, fol. alternis sessilibus lanceolatis, subdentatis. Cymis corymbosis paucifloris, floribus purpureo-rubris inflorescentia corymbi centrifuga.

Capituli subcylindracei.

Involucrum imbricatum monogamum.

Flosculi omnes perfecti tubulosi, tubo sursum gradatim ampliato, 5-fida, laciniis lineari-oblongis æstivatione valvatis v. Brunonian, v. apicibus confluent.

Stam. tubo apicem versus inserta. Anth. basi simplices apicem appendiculam ovatam cellulosum planam gerentes. Pollen areolatum ! hispidulum.

Ovaria oblonga, vix compressa pubescentia. Pappus 1-seriatus setaceus dentatus. Ovulum liberum raphe nulla etiam post fecundationem.

Stylus basi paullo dilatatus in apice disco quasi *articulat*. apicem versus pilosus. Stigmata papillosa recurva.

Akenia valde immatura, subcylindracea oblonga, pubescenti-pilosa, apice nec contracta, pappo immediate coronata. Raphe

completa! chalaza inconspicua. Semen liberum saltem per junius.

Hab. Assam. In arenosis Burrumpootur: *March* 30*th*, 1836. *no.* 461.

3. *Lactucæ* sp.

Annua, lactescens, fol. alternis amplexicaulibus longissimis infimis, linearibus, basi sagittatis, superioribus hastato-sagittatis dentatis, dentibus angustis rectis vel et sæpius in foliis infimis retrorsum spectant. summis integris.

Cymis corymbosim dispositis pedicellis basi minute bracteatis. Capitulis ad anthesin subcylindraceis, demum et præsertim fructiferis e basin ovata conicis.

Involucrum 1-seriatim imbricatum basi squamis minimis, squamis demum arcte reflexis.

Receptaculum nudum planiusculum punctatum.

Flosculi omnes perfecti, hermaphroditi ligulati, tubus brevis gracilis ligula concava, nec plana, ore nudo, 5-fido. ven. Brunon. v. recurrent. 0.

Stamina ore inserta. tubum excedentia. Antheræ basi bisetosæ setis filamento-approximatis.

Pollen globosum areolat. areolis paucis, hispidulum in loculis 1-seriatum! fasciculus vasculosus filam. tenuissimus forsan nullus.

Stylus filiformis basi nec dilatata, apice pilosus, stigmata linearia. Discus epigynus parvis subconicus.

Ovaria ovalia compressa 10-costata, apice valde constricta-ore calycino tunc ampliato annuliforme pappus 1-seriata simplicem sessilem setaceum, dentatum gerente, limitis calyces et pericarpii valde distincti. Ovulum liberum, raphe 0.

Akenia, brunnea ovata compressa, 10-cristata, glabra costata. Pappus stipitat. calycis collo nempe valde elongato. Semen fere matura liberum testa cellulosa demum pericarpio leviter adnata, laxiuscula, raphe 2-3 completa. Tegument

inter embryon. arcte applicit. Embryo ordinis. Pappus persistens.

Hab. Assam. In arenosis Burrumpootur: *March* 30*th*, 1836. *no.* 462.

Prenanthes.

1. *Prenanthes* sp. Pl. CCCCLXIX.

Fol. subtus glaucescentia, carinata marginibus rubris supra læte viridia, subtus albida.

Bracteæ rubro-tinctæ, anthod. viridesc. fusco-tinct. Flosculi citrini. Anth. demum reflexum brunneum.

Herba vix pedalis sæpius spithamæa, icone igitur nimis ampla.

Hab. Burmah. In campis Carmeam versus. Carmein, Journey from Assam to Ava: *April* 2*nd*, 1837.

2. *Prenanthes* sp.

Planta lactescens annua erecta ramosa, fol. caulis basin confined to, ambitu obovata, runcinata, lobis spinuloso-dendatis, summis ramos fulcientibus, lineari-spathulatis vel setaceis. Inflorescentia corymb. efformas, partialis cymosa ? capitulis axi proximis prius evolutis.

Involucrum per anthesin cylindraceum, ovato-conicum, vel lageniforme sub-seriatum, imbricatum. basi squamulis auctum pauciflorum, post anthesumi reflexum.

Flosculi ligulati, post anthesin leviter cohærentes et involucro connivento simul expulsim.

Tubus infra mediam pubescent. lamina 5-dentata, venatio Brunor. v. decurrente 0.

Antheræ adnatæ ut etiam tubo corollæ ? Pollen hispidum globosum.

Receptac. nudum. Pappus copiosus, setaceus dentatus.

Ovula libera.

Akenia lutco brunneo-striata, secus stries hispidula. Tegument. duplex exterius e cellulis oblongis, fragile laxum.

Interius membranacei (sacculus embryonifer?) embryonem orthotrop. arcte vestiens breviter stipitat.

Hab. Assam. In cultis Bishenath: *March* 21*st*, 1836. *no* 445.

Quoad raphem iterum examinanda.

Compositæ sp. Pl. CCCCLXX.

Frutex carnosus, glaucescens.

Flosculi brunnescentes.

Hab. Burmah. In collibus Tsigain. Journey from Assam to Ava: *May*, 1837.

Cirsii sp.

Hab. Bootan. *Panuka May*, 2*d* 1838.

GALIACEÆ.

Galium.

Galium Khorasanensem Gr. Pl. CCCCLXXIII.

Planta scabrella, 3, 4 uncialis vel spithamæa. Fol. verticillatis quaternis rotundato-oblongis, breve petiolatis, petiolis basi coalitis, internodiis caulis tumidis et angulis qui opposit. foliis scabris.

Fol. floralibus oppositis, oblique sitis! oblongis, inflorescentium inter petiolaris, cymoso-subumbellata, cernua, quinque flora.

Flores minuti suffulti, bractea cucullata, petioloidea venosa, viridi-alba, et fere recondita, flore centrali nudo.

Calyx adhærens, 4-partitus, laciniis rotundato-ovatis sub carnosis, æstivatione valvatis apicibus minute inflexis, persistent. ad anthesin patentis demum conniventes, tubo pilis clavatis aspectu hirtellis, præsertim ad apicem hirsuto. Pet. 0.

Stam. 4, laciniis calycis altern. Filam. evasculosa, ad basin antheræ incrassata, tunc attenuata, Anth. bilocul. basi affixæ, introrsæ.

Pollen globosum plicis? radiantibus pluribus, cæterum læve glabrumque.

Stylus cellularis apice bilobus, lobo cuique stigma capitat. e cellulis rotundis radiatis ? gerente.

Discus epigynus carnosus bilobus, lobo. majore, loculo fertilo opposito.

Ovar. inferum omnino biloculare. loculo interno quoad axin̈ inflorescentiæ semper experti et minore, altero obliquo uni-ovulato.

Endocarp. discretum celluloso-membranaceum, evascul. ovulum arcte investiens, per totum latus interius placentæ adnat.

Ovulum ascendens, e nucleo tantum. Funiculus brevis. axin proximis et raphe brevis, apex nuclei, hilum prope.

Fructus ?

Habit. Affghanistan in collibus sterilioribus inter axes et in super rupes, vulgatim per totam plagam Khorasanensem.

This is a very curious plant, agreeing with Galium in every thing, but its bracteate involucrated flowers, very sepaloid perianth, and the abortion of the inner cell of the ovary. There are many points that it presents for consideration.

Obliquity, from abortion of some of the leaves of the whorl, producing the inflorescence. The curious bracteæ. The perianth, the epigynous disk. The very curious structure of the inner layer of each cell of the ovary. The constant abortion of the inner of these, and the reduction of the ovula to a nucleus.

There can be no doubt in this plant, of the nature of the perianth, which is sepaloid from its situation and natural colour, it therefore becomes necessary to revert to Galium, and its congeners, to enquire into the true nature of their inflorescence, and structure of the layer lining the cells of the ovary: I know of no other instance.

This performs every office of a tegument to the ovulum during its younger stages, and as the testa occasionally does, it becomes during the formation of the seed, so fine, as to be scarcely, if at all demonstrable; it may readily be mistaken for a testa or tegument, especially if carelessly dissected, but its existence in the barren cell, and its being perfectly closed, demonstrate that it does not belong to the ovulum, independently of the considerations derived from study of the development of this, and its entire structure.

Fig. I.

1. Plant natural size, radicles reddish as madder.
2. Florescence, one bracte and its flower removed to shew the nakedness of the central flower.
3. Lateral flower and bracte.
4. Perianth just opening,—shewing the æstivation.
5. Flower, just before expansion.
6. Expanded flower, 6*a* Perianth and genetalia viewed vertically.
7. Inner view of anthers before dehiscence.
8, 8. Inner, outer, and lateral view of stamina after do.
9. Pollen too minute for $\frac{1}{20}$ lens.
10. Long section of flower anthers removed.
11. Style and stigmata.
12. One of the hairs of the outer layer of ovary.
13. Long section of the ovary, shewing the closed nature of the inner membrane (not oblique as it should be.)

13*a*. Preparation younger state, shewing the same.

14. Ovulum, 14*a* its apex.

Fig. II.

1. Flower just at expansion.
2. Ovary or pistillum, calyx then removed.
3. Nucleus probably accidental, although the cohesion of the tube was finished, no other instance occurred.

4. Shews development of ovula, *a* placenta and septum, portion of, *b b* portions of the outer layer of which the calyx is a direct continuation ; inner layer *d*, *a* nucleus, *d* funicle, *e* embryonary sac, *f* embryo.
5. Some more advanced, the same letters have the same references ; *f*, a detached embryo (not enlarged enough) young to shew the nature of its pedicel.
6. Very young ovary laid open *a a* outer layer, *b* inner ditto, closely investing the ovula *c*.

6*a*. Ovule, *c* detached.

7. More advanced, the same letters, have the same references.
8. Inner membrane which bursts instantly towards its upper end.
9. Young fruit, *a* outer layer, *b* inner do., *c* nucleary do. cohering with it, *d* hyaline margin of albumen, *e* albumen, *f* embryo (a plan) a section being impossible.

9*a*. Embryonary sac—albumen and embryo, this is shewn artificially.

9*b*. Portion of its albumen near the margin.

10. Same, more advanced, *a* outer layer, *b* inner now composed of inner excessively fine and nucleary membrane cohering intimately, *c* albumen, *d* embryo.

Those leaves are abortive that are on the opposite side of the stem to the inflorescence, it follows hence that as the inflorescence is unilateral one side of the stem throughout its flower-bearing portion, will produce leaves, the other flowers ; of the leaves, one axil is empty ; the other bears alternately a flower bud.

The inflorescence although tending to the umbellate form, is a true compound raceme, its form is curious, in as much as it presents none of that irregularity so prevalent in cymes, to which class it obviously belongs. We may therefore meet with one flowered species, in which case no bractes will be developed, or we may meet with a one flowered species, with bractes, but these empty.

In one instance, one of the lateral flowers had pedicels, on its inner side with a flower developed, and as this was much smaller than that in the axilla of the leaf, we may conclude that the flowers are all terminal, or rather that each lateral flower-bud may become a simple raceme.

In Galium, the carpella are both developed, and both lobes of the disk are equal, in the more petaloid species of this genus, the perianth separates all round the base, of the albumen.

From casual examination I think that the inner membrane is distinctly visible in the fruit.

Throughout all the stages, I have examined of the development of the ovulum, and these include very minute buds: it would appear that the ovulum consists of a nucleus alone; the same organisation exists in Galium, and probably in some? Rubiaceæ. Within is developed an embryonary sac of that form which I call albuminary, and the nucleus becomes at last reduced to a thin coat, cohering most intimately with the inner layer alluded to, and also slightly with the external or calycine? layer, so that the albumen *i. e.* the seed, has no demonstrable covering.

The membranous nature of the embryonary sac, which I should observe is of late formation, *i. e.* it does not exist before impregnation, is well seen in the nearly mature albumen, which presents a hyaline membrano-mucous-looking edge.

In this sac, opaque grumous grains of albumen are copiously developed.

It follows that the usual account of Galium are altogether wrong; on this head it will be necessary to examine Decaisnes Rubia.

The nucleary ovule, and the reduction of the perianth forcibly call to mind Santalaceæ, from which it is removed in the first place by the relation of the stamina to the perianth, and in a less degree by the bilocularity of the ovary.

Organisation seem to be much lower than in Galium? the stamina and the styles being altogether cellular, this last is a very unusual circumstance.

2. *Galii* sp. Pl. CCCCLXXII. Itinerary Notes p. 30, *no.* 472.

Hab. Khasyah Mountains. *Chura Ponjee: Sept.* 28*th*, 1837.

CAPRIFOLIACEA.

Lonicera.

Loniceræ sp. Pl. CCCCLXXX. Fig. II.

Frutex pygmæus, prostratis, ramis brevibus ascendentibus. Cortex alba sæpe fibroso-lacerata. Ramula compressa.

Fol. subsessilia coriacea linearia obtusa 1-venia, siccitati margine recurva. Petioli brevissimi basin dilatati et saltem juniores in annuli coaliti.

Flores bini in pedunculo axillari, folior. 3-4 brevior. involucrati. Involucri folioli 2, profunde biloba, (sinu latô) plus minus coalita interdum, venosa, sinu aliquando in lobum folior. formâ simile product.

Cor. non visa.

Fructus juniores sessiles, 5-alato angulato, apice sepalis 5 lineari oblongis concavis obtusis magnis (æquantibus tubum) venoso-reticulatis coronatis, discoque epigyna 3-loculares, loculi 4-6 spermis. Semina (juniora) anatropa pendula, perparia subcollateralia, uno loculi cujusque tantum perfect. Raphe extrorsum.

Fruct. maturus involucro planato suffult. descreti subrotunda læves, glabri, baccati, calycis laciniis immulatis, coronat. sub 3-loculares. Semina pulpa immersa, fertilia læte ovata compressa, pendula, micropyle supera. Tegum. exter. pulpa adhær. crustac. crassiuscul. Interius tenuiss. memb. Albumen copiosum carnoso-oleosum vestiens. Embryo axilis,

albumine duplo circiter brevius. Radicula crassa supera. Cotyledones foliaceæ, planiusculæ ? lanceolato-ovatæ.

Hab. Hindoo-Koosh Shingly bouldery ground about the Torrent, Upper Kaloo, alt. 11500 ft. In fruit in *Sep.* 1840.

Obs. The outer layer of the ovarium in the youngest state I have seen it, is separable, from the body, with which it appears to have no connection, only becoming continuous with the calycine laciniæ at their base. The body of the ovaria then presents 10 costæ, not very prominent, 5 opposite the sepals and continuous with their central veins, 5 alternate. The union of the placentæ in the axis appears slight, no particular ovulum appears to be fecundated, I have not been able to ascertain positively whether the position of the raphe relative to the placenta is due to a torsion of the funiculus.

This appears to be an undescribed genus, approaching so far as the characters in Endlicher's Genera go, to Lonicera and Triosteum. As however it approaches in habit somewhat to Lonicera bracteata, Royles Illust. t. 53 and agrees tolerably with the character of Lonicera, chamacerasus. End. Gen. no. 3337. I have referred it to that genus, it may be necessary to look at the bracteæ again,—particularly the fruit.

1. Plant nat. size.
2. Fruit.
3, 4. Lateral views.
5. Front ditto.
6. Long section.
7. Cutis detached.
8. Long section.
9. Placenta with ovules.
10. Sect. long.
11. Seed.
12. Transverse of ovary.

VIBURNUM.

Viburni sp. Pl. CCCCLXXX. Fig. I.

Frutex vel arbuscula.

Pubescentia subfuscescens, flores albi, anth. ochroleucæ, odor. dulcis.

HAB. Burmah. Ad ripas torrentis Namyoom: *March* 5-6*th*.

SAMBUCUS.

Sambucus sp.

Planta suffruticosæ, 4-5 pedalis, ramis oppositis adeo dentibus summis fastigiatis.

Caulis crassus, centro cavus, lineis viridibus lenticellis parvis verrucosis notatis.

Folia opposita, imparipinnata, superiora interdum, 3-foliata, raro simplicia, inferiora $3\frac{1}{2}$ juga, foliolis oppositis breviter petiolatis, elongato-lanceolatis acuminatis basi obliquis et sæpius lateri inferiore argute serratis, serraturis mucronatis, mucrona brunnescente, supra læte viridia aspectu velutino, infra pallida margine uno utroque basin versus glandula 1 vel 2 donato, terminali aliquando binatim diviso glabra.

Petiola crasso supra uti etiam petiolata canaliculata, viridistriata.

V. secondariæ oblique arcuatæ, ope venis tertiariis mutuo nexæ, sæpius alternæ v. additorius distinctiusculis ut plurima arcuatis, tertiariis transversis vel cum v. primaria, angulum rectum efformantibus. Cuticula supera e cellulis angulatis forma variis, infera quæ tantum stomatosa e sinuoso cellulis! sinubus angulatis nec ut sæpius accedit rotundatis.

Stomata magna numerosissima conspicua aperta.

Stipulæ? foliolis similibus sed minoribus magnitudineque valde variis, summis linearibus vel clavatis.

Corymbi terminales, hoc axin primarium terminanti longe prius evoluto, subfastigiati sed centralis rami divisionesve

laterales duplo longiores, (ramuli subsecundi ascendentes,) pubescentes ramulis basin vel basin versus bracteis spathulatis viridibus suffultis. Cymorum partialium dichotomorum, flos centralis semper prius evolutus, si racemorum flos infimus.

Flores numerosi, odore *Jonquillino* extus albi intus carnea, filamentis saturatius carneis. Antheris brunneo-rubris.

Alabastra subglobosa.

Cal. albus, ovario adnatus, 5-dentatus.

Cor. rotata profunde 5-partita, laciniis sepalis alternis ovato-lanceolatis, æstivatione valvatis.

Stam. 5-sepalis opposita, corollæ basin inserta. Filamenta crassiuscula subulata, carnea purpureo-maculata. Antheræ biloculares, subcordatæ initio introrsæ, medio dorso affixæ. fere didymæ loculis demum divaricatis et quasi transversis. Pollen lutescens ovatum hinc sulcatum, cæterum læve, immersum globosum.

Ovar. 3-loculare, loculis, 1-ovulatis, inferum, ovula pendula foramen superum hilum prope, raphe axi proxima. Styli 0. Stigmata tria rotundata sessilia.

Hab. Upper Assam. In humidis et præsertim secus ripas fluminis Kundul. Suddyah. Floret Junio.

RUBIACEÆ.

Stylocoryna.

Stylocoryna bispinosa.

Scandens, folior. ramulor. par infime in spinas abortient. spinis subulatis deflexis quoad ramulos, foliis ovati-ellipticis subintigris, stipulis latis intigris decidius, cymis ramulos terminant divaricatiss. floribus albidis suaviter odoratis.

Cal. tubus ovatus ultra ovarium productus ad apicem ejus demum circumscissus breve 5-dentatum.

Cor. hypocraterif. tubo calycem duplo excedent. gracili 5-partit.

Anth. sessiles ad faucem. Stigma exsert. clavat. sulcat.

Discus epigynus compressus parum elavat. Ovar. 2 locul. placentis carnosis intra loculos product. Ovula 00, placentis immersa.

Hab. Mergue. Ad littoram Ins. Madam. prop. pator scandens in fruticet. *no.* 869, *Dec.* 1834.

Gardenia.

Gardenia carinata.

Arbuscula, fol. cuneato-obovatis, obtuse acuminatis breve petiolatis, stipulis membranaceis ochreæformib. floribus maximis axillaribus solitariis aureis suavissime odoratis.

Cal. tubus ultra ovarium productus, ad apicem ovarium circumsciss. irregulariter 5-dentat.

Cor. hypocraterif. tubo longissimo partita.

Stam. fauci inserta. Anth. sessili lineari subinclusæ.

Stylus longissimis, a medio infra incrassat. a medio supra pubescens. Stigma exserta bilamellat.

Ovar. 1-loculare! placentis 2 lunulatis parietalibus, ovula 00, foramen hilum prope. Pl. CCCCLXXIV. Fig. III.

Fructus drupacea maxima, ovi magnitudinis, apice reliquis calycis truncâte coronat. 5-costat. sub 5-angulat.

Semino 00, complanata, testa diluta brunnea dura albumen corneum semini conformi. Embryo axilis. Cotyledones planæ. Radicul. longa hilum spectans. Plumula inconspicue.

Hab. In humidis Mergui an culta, vide etiam in sylvis Moulmein et ad littoram Manis, Kully Gyoon. *Dec.* 1834. *no.* 831.

Randia.

1. *Randia.*

Frutex dichotome ramosus. Ramulis divaricatis spinosis junioribus pubescent, spinis axillaribus oppositis, rectis, (ramulis abortivis,) foliis ovato-lanceolatis breviter petiolatis,

acuminatis subintegris, supra lucidis, subtus ad nervos pilosis, floribus 2-3 in pedunculo vel axillaribus vel in dichotomis ramulorum, majusculis conspicuis, albis subsuaviter odoratis in pedunculo articulatis ibidem bracteis ovatis 2 opposita.

Cal. tubo cylindrico ultra ovarium producto 5-partito, laciniis ovatis.

Cor. hypocrat. tuto calycem triplo fere excedente limbo 5-partito, laciniis patens.

Stam. fauci inserta, exserta, filamenta sub 0. Anth. lineares:

Stylus filiformis longit. corollæ. Stigmata 2 ovata conniventia.

Discus epigynus glandulosus integer. Ovarium extus breviter pubescens bilocule pluri-ovulat. ovulis placentis carnosis subimmersis.

Hab. In sylvis, Mergue : *no.* 306. *Sept.* 1834.

2. ***Randia exaltata.***

Arbor. alata 5 opedalis, trunco gracili. Ramulis cinereis, junioribus compressis ferrugineo pubescentib. Folia ad apices ramorum confertis breviter petiolatis inæqualibus obovatis breve acuminatis subobtusis, subrepandis, penninervus subtus ad nervos et axillas eorum pubescent. Cymis ex axillis foliorlapsor. sub 3-chotomis, bracteatis ferruginea pubescent. Pedicellis brevibus calycibusque extus pubescent. floribus magnis conspicuis albis suave odóratis.

Cal. tubus ovat. ultra ovarium product: limbus 5-dentat. dentibus acutis brevib. erectis.

Cor. infundibulifor. extus breve pubescens tubo longissimo infra medium ampliato, fauce nuda, 5-partit. laciniis subæqualis ovato-lanceolatis patentib. æstivatio contortis.

Stam. 5, fauce lineas $1\frac{1}{2}$ infra insert. laciniis alternant. Anth. longissimæ sessiles lineares utrinque acutæ bilocule longitud. dehiscent. inclusæ.

Stylus longissimis inclusus filiform stigma clavat. inclusa e labiis 2 lanceol. carnosis connivent.

Ovar. 2 loculare, loculis pluri-ovulat. ovulis placentis carnosis subimmersis foramen pilo subopposit.

Fructibus 8-lobosis pomi parvi magnitud. coronat. calycis dentib. subobsoletis, conoque breve obtuso e disco epigyno ampliato orto, bilocularis polysperma sublignosa, matura baccata? Semen 00, compress. angulat. albumen carnoso-corneum. Embryo inversus, vix axillis. Radicula longissim. filiformis obtuse. Cotyledones foliaceæ cordatæ. Plumule inconspicua.

Hab. Mergue. In humidis, cum Rhizophoreis, Pullow: *no.* 962, *Jan.* 1835.

Stipuli integris basi connatis ovat. apice subulat. ferrugineo pubescent. Tubus corolla ad partem constrictam villosus. *Sect. Euclinia* omnia Randiæ sed embryo vagus.

3. *Randiæ* sp.

Ramuli ex albido virescentes, internodii breviusculi, ad artic. nodosve sæpius subtumida.

Rami plures in spinis breves calcariformes 3-lineales degenerat. Petioli vix bilineales, lamina foliorum sublanceolata acutiuscule parce undulata, subcarnosa, long. $3\frac{1}{2}$ unciali, lat. $1\frac{1}{4}$, $1\frac{1}{2}$. Stipulæ?

Cymæ florum terminales plurifloræ, foliis breviores: pedunculis ramisque, ram. lateral. 2-3 flori, abbreviatis, tetragonis, bracteæ scarioso-herbaceæ, acuminatæ.

Pedicelli laterales sub 3-lineales, infra medium bibracteolati, flor. terminali vel centrali subsessili.

Flores magni, odorati initio albi, cito ochroleuci, æstiv. contorta imbracata.

Calycis tubus subcylindric. $2\frac{1}{2}$ lineal. lacinia 5, rarius 6 e basi cordata subulato-acuminata, apice subreflexa.

Corolla hypocraterif. tubo gracile, diametro tubo calycis vel ovaria 8-linealis, laciniæ 5-6 angusto-lanceolatæ, acutiuscalæ, patentes demum subreflexæ, 5-6 lineales long. 3 lat.

Stamina totidem alternantia fauci inserta paullo infra sinus

lacinearum, filamenta brevissime. Antheræ lineares, in corolla decumbent. biloculares, subacutæ, connectivum carnosum: insertio supra basin et infra medium.

Stylus subclavatus tubo paullo longior. stigma oblongum magnum exsertum emarginatum, vel stylus apice a lobos 2 lanceolatos erectos dorso sub 5-striatos, intus stigmatosos et apice excepto cohærent. divisus.

Ovarium calyce duplo brevius annulo parvo lutescente coronatum, biloculare, ovula plura placentis intrantibus subimmersa.

Fructus globosus apice initio calyce coronat. demum c. lapso areolato-umbilicatus biloculares subbaccatus, ater.

Semina parva in placent. subfungosa (cum placenta baccante recedentia) fere immersa, angulati ossea, tegum. unicum, osseum, extus papillosum albumen copiosum cartilagineum. Embryo albus axilis. Cotyledones subcordatæ. Radicula duplo longior. hilum versus.

Hab. Malacca at Nhinghull. *January* 30*th*, 1845.

Ophioriza.

Ophioriza sp. Pl. CCCCLXXV.

Caulis succulentus viridis pallide, stipulæ foliaceæ virides. Petiol vix viridescentes.

Fol. subtus albida, supra saturata viridia, et ibidem intervenia convexa sunt. Venæ secondariæ conspicuæ, conspicui. arcuratæ, subtus intervenia reticulatæ sunt, venulis in centrale subconfluentibus.

Bracteæ calycesque fusco-virides, inflorescentia dense untans, flores pulchre purpur. rosacei 5-alato-angulati.

Hab. Naga mounts, between Assam and Burma at Kuttack Boom in moist ravines. *March* 16*th*, 1837.

Kohautia.

Kohautiæ sp. Pl. CCCCLXXVII.

Caulis basin purpurascens, foliis subglaucis subtus carinatis. Corolla omnino fuscescens laciniis saturatius coloratis.

Hab. Burmah at Katha in Campis graminosis : *May 9th*, 1837.

Hedyotis.

Hedyotis sp.?

Herbacea hispida prostrata radicansque, foliis lanceolatis acutis cum mucrona integerrimis asperis ciliatis supra atro-viridibus infra pallidis, floribus glomeratis in axilliis albis, stipulis multi-setosis.

Cal. tubo brevis limbo 4-dentato dentibus acutis suberectis.

Cor. infundib. tubo dentium calycinarium longitudinis. limbo. 4-partita, laciniis revolutis.

Stam. 4, fanci inserta, 1-2 interdum abortient. filam. filif. exserta. Anth. biloculi longit. dehiscent.

Stylus filiforme longitudinis filamentorum, stigma capitat. 2-lob.

Ovarium 2-loculare, loculis 00 ovulatis, ovulis placentis carnosis affixia.

Hab. Mergue. In ruderatis, Madamaca : *no.* 277. *Sept.* 1834.

Oldenlandia.

Oldenlandia linoides Gr.

Herba erecta spithamæa, ramosa hispida caulibus dichotomis, foliis sessilibus decussatis cordato-lanceolatis, acutis, ciliatis 1-nervus, floribus erectis longe pedicellatis, læte cæruleis, 3-4 ad apices ramulorum confertis vel solitariis.

Cal. tubus obconicum 4-dentat. dentibus acuminatis, tubo longitudinis.

Cor. campanulato tubo calycem excedente limbo 4-fido, laciniis ovatis suberectis.

Stam. fauci inserta, tot quot calyces dentes et iis oppositæ. Anth. subexsertæ, bilocul. longit. dehiscentes

Stylus filiformis stamina paullo superans, stigmata 2 papillosa recurva.

Ovarium calyces dentibus subpatentibus coronata, pilis cellulosis inconspicuis sinubus interjectis 2-loculare, multiovulat. placentis carnosis intra loculos productis ovulis in placentis immeris.

Stylus inconspicuis linearibus setaceo-pinnatifidis, folior. pagina supera lucida. Aspectu omnino *linoideo*.

Hab. Mergue. In arenosis humidis, Culweng: *no.* 377. *October*, 1834.

Wendlandia.

Wendlandia secunda Gr.

Frutex glaber, fruticosa, foliis obovato-lanceolatis glabris, floribus spicato-paniculatis erectis, spicis terminalibus secundis, foliis ternatim verticillat. in ramulis junioribus, floriferis confertis obovato-lanceolatis utrinque acuminatis intigris venosis subcoriaceis subtus pallidis.

Floribus spicato-paniculatis ochroleucis. Paniculis cymiformibus, spicis secundis.

Cal. tubo brevi cylindrico 5, dentat. dentibus minimis subæqualibus.

Corolla tubo elongato subclavato fauce ampliata limbo 5-fido laciniis acutis erectis.

Stam. 5, fauci inserta, petalis alternantia inclusa. Filam binis. Anth. utrinque emarginatæ lineares biloculæ longit dehiscent.

Stylus clavatus stamina æquans. Stigma bilabiat. exsertum. Ovarium biloculare, loculis multi-ovulatis placentis intra loculos productis affixis.

Æstivatione corollæ contorta stipulis persistent.

Hab. Mergue. In sylvis prope Culweng: *Aug.* 1*st*, 1834. *no.* 212.

Mephetidia.

1. ***Mephetidia.***

Calycis tubus ovatis, ultra ovarium parum productus, breviter 4-dentat. dentibus erectis.

Cor. subhypocraterif. tubo cylindrico calycem duplo excedente, limbo 4-partit. laciniis ovatis patentibus, apicibus crassissimis coccullatisque, laciniarum bases fauxque pilosæ, faux clausa.

Stam. 4, sinubus corollinis inserta. Anth. ovatæ subsessiles, bilocul. longit. dehiscentes, parce pilosæ, inclusæ.

Stylus filiform. tubo corollæ brevior, stigmata 2, ovata, papillosa, conniventia *bifida*.

Discus epigynus clavatis rotundatusque integer. Ovar. 4-loculare, loculis 1-ovulatis, ovulis erectis, foramen hilum versus. Pl. CCCCLXXIV. Fig. IV.

Capsula drupacea baccata, læte azurea. calycis limb. reliquum coronat. ovulata angulata.

Hab. Mergue. In sylvis densis Madamacca prop. Paloor: *Dec.* 1834. ***Mephetidia*** Bl. and ***Lasianthus*** of Jack.

2. ***Mephetidiæ*** sp. Pl. CCCCLXXVI.

Stipulæ seniores brunneæ, juniores virides, uti 2 annuli.
Fol. subtus albida, venæ secondariæ anastomosant.
Pedicelli calyces virides. Cor. alba demum ochroleuca.
Hab. Khasyah Mounts, Myrung.

Pæderia.

1. *Pæderia fœtida*, Pl. CCCCLXXIX. Fig. III.

Fructus ovatis, calyce limbo dentato toroque epigyno persistentibus coronatus. Calycis parietes a pericarpio maturi-

tato secedentis tenuissimi membranacei fragiles subdiaphani utrinque venis? tribus notati.

Carpella 2, secedentia pendulaque ex apicem, e basi fructus ortum ducentis accumbentia, complanata, alataque, disco centrale carnoso, baccato viride odoris aterimi.

Semen unicum ovale cuique carpello, medio affixum, parte baccata inclusum, parieti hujus exteriori approximatum.

Tegumentum tenue subobsoletum ex albumina secedens et cavitatem loculi quasi adnat.

Albumen carnosum forsan ob immaturitatem.

Embryo axilis radiculi longiuscula infera teres. Cotyledones planæ cordatæ foliacea. Plumula inconspicue.

2. *Pæderia,* Pl. CCCCLXXIX. Fig. IV.

Planta scandens volubilis.

Fructus cymosus paniculatus brunneo-castinea globosus lucidus, apice coronata calyce breviter 5-dentata, dentibus in fructu depressis siccus, calycis parietes tenuissimi liber!

Pericarpium baccatum liberum biloculare, pulpa gelatinosa diaphana extus virida.

Semen 1 cuique loculo plano convexum, introrsum leviter curvatum potius arcuatum vix plano-convexum sed menisciforme apicem versus affixum.

Albumen corneum amplum. Embryo orthotropus axilis, directione albumis. Radicula brevis obtuse. Cotyledones planæ foliacei accumbentes albæ rotundatæ basi profunde cordatæ. Fructus indehiscens, secus septam in hæmispheros 2, demum secedens. Plumula inconspicue.

Hab. Assam. Odorque præsertim fructus Pæderiæ, occurrit in sylvis ubique paulo infra Suddhya Negrigam usque: *Jan.* 21*st,* 1835.

Psychotria.

Psychotria, Pl. CCCCLXXIX. Fig. II.

Fructus capitata, capitulis bracteatis in cymis terminalibus disposita baccata breviter stipitata. Baccæ ovates, coc-

cineæ læves, apice toro concolore, medio foveolato coronatæ, cæterum nudæ, calyces nempe limbo deciduo, biloculares, 2 spermæ.

Semen 1 cuique loculo erectum, plano convexum faciebus planis internis approximatis.

Tegumentum duplex, exterius fibrosum coriaceum fibris tenuibus irregulariter dispositis, interius cellulosum rubrum, inter albumen facie externa convexa, pluries et haud profundem intrans, secus fauci planam interiorem medium seminis versus profunde et in locis duabus intrans. Raphe fibrosa chalazaque inconspicue albumen corneum ruminatum.

Embryo orthotropus basi albuminis versus locatus hujus directione.

Cotyledones planæ foliaceæ, incumbentes serie faciebus latioribus seminis parallelæ.

Plumula inconspicua. Radicula longa teres apice conica.

Hab. Frutex. In sylvis per totam regionem. Upper Assam vulgatum occurrit. *Feb.* 1836.

The outer integument consists of at least 2 layers, owing to the contrary directions in which they pass and to which the irregular fibrous appearance is to be attributed; near its surface vast quantities of fascicled raphides occur.

It is well worthy of examination to ascertain whether the direction of the cotyledones is in all the 2-seeded species of Rubiaceæ, parallel to the broader faces of the seed, and whether, in the many seeded it is the reverse. In these last however the narrow borders may be the true faces.

Epithinia.

Epithiniæ sp. Pl. CCCCLXXVIII.

Arbuscula vel frutex, corona rotunda. Fol. longiuscule petiolatis obovato-rotundatis, obtusissimis, præcoriaceo-carnosis glaberrimis integerrimis margine sæpe voluto, venis secondariis paucis distinctiusculis. Stipulis interpetiol. ore integerrimis annuli in more coalit. basi gibbos.

Cymis axillaribus foliis brevioribus pluries dichotomis, florem dichotomum primaria scrotino, bracteis sub 0. Floribus parvis numerosis exalbo carneis.

Calycis tubus compressus elongatus sub 8-lineatus ultra ovarium in limbum minuti 4-dentat. membranac. product.

Cor. hypocraterif. 4-partita laciniis reflexis late ovatis, æstivatione leviter contort. throat very hairy, tubo calycis limbo duplo longiore.

Stam. fauci inserta, reflexo-patenta exserta filam. brevia. Anth. dorso affixæ subsagittatæ loculis pollinif. linearibus Pollen. ?

Discus epigynus sub 8-lobus.

Stylus rubescens exsertus, apice incrassato-bilobum, lobis sub divergentibus interne stigmatosis.

Ovar. biloculare. Placenta loculi cujusque intrans *centralis* divergente bipart. ramulo supero ovulum erectum affigens, infero ovulum pendulum. Tegument connata ? Raphe ½ completa, apex nuclei hilum prope.

Fructus oblongo compresso 8-sulcato carinat. Epicarp. celluloso-spongiosum. Mesocarp. crasso in carinas product. album, indurat. Endocarp. osseum, vix separabili spontaneum in pyrenas duas, calycis limbo imulat.

Semina sæpe abortiva, situs et forma ovulorum, hæc erect, hoc pendulum. Tegument. membranac. tenue, hinc raphiger albumen carnosum, mediocre.

Embryo orthotropus albus (radicula longiuscula hilum versus epectans) Cotyledones planiusculo.

Hab. In Rhizophoreis Pulo Bissar. Circa Singapore vulgatem.

Obs. It certainly has stipules, but the usual lamina is nearly abortive.

Wight and Arnot have mistaken, at least the situation of the upper ovulum, and their description of the stigma is incorrect.

The fruit is scarcely drupaceous.

The radicle is not superior in the upper seed, in both quoad the seed and placenta it has the same direction.

1. Plant nat. size.
2. Apex of a branchlet, shewing the vernation and stipulation.
3. Bud just before expansion.
4. Portion of inflorescence.
4*a*. Single flower.
5. Corol. laid open.
6, 6. Stamina.
7. Pollen dry.
8. Do. in water.
9. Pistillum.
10. Apex of style and stigmatic surfaces.
11. Ovarium part of limb of calyx cut away to shew the lobed epigynous disk.
12. Long section of ovary shewing the peculiar placentation and direction of ovula.
13. One placenta removed.
14. Fruit.
15. Transverse section do.
16. Long section do.
17. Seed long section one cotyledon cut away.
18. Embryo.

Ixora.

Ixora decipiens.

Frutex, foliis oblongis. Inflorescentia thyrsoideo-paniculata, paniculi trichotomi. Dentes calycinæ paullo post anthesin pallide rubri. Flores albi.

Cal. tubo brevi 4-dentat. dentibus erectis, postea deciduis.

Cor. tubo cylindrico calyce triplo longiore, limbo 4-fido, laciniis reflexis. Faux nuda.

Stam. 4 laciniis alternantia. Filam. fauci inserta, reflexa. Antheræ introrsæ, reflexæ, biloc. longit. dehiscent.

Stylus filiform longitudinis tubo, a basin usque ad medium parce pilosus. Stigmata 2.

Ovarium biloc. loculis 1-ovulatis, placenta axilis. Pericarp. baccat. globosum magnitudinis pisi. Semina plano-convexa, testa dura albumen carnosum. Punctum hili situm indicat. Cotyledones cordatæ planæ foliaceæ. Radicula longe hilum spectans acutis coriaceis integris.

Structure of the coats of the seed. External coat testa, is formed of loose cellular substance, almost horny of elongated cells, which have no determinate direction.

Endosperm, of elongated cellular tissue resembling woody fibre and running in a longitudinal direction, it is capable of being detached with tolerable facility. Pl. CCCCLXXIV. Fig. II. longitudinal section of the seed with a plan of its inner surface and view of the cotyledon and radicle. *March* 31*st*, 1833.

Spermacoce.

Spermacocæ sp.

Pubescentia hispida decumbent. ramis bicanaliculatis, foliis subsessilib. lanceolato-linearib. acutis cum mucrona, integris, stipulis multi-setosis, floribus in axillis congestis, albis.

Cal. tubo brevi dentibus 5, lanceolatis ciliatis mucronatis, demum conniventibus pilosus, sinubus acutis.

Cor. tubo gracili, calyces dentium longitudinis, limbo 4-partib. laciniis revolutis parce pilosa.

Stam. 4, longe exserta fauci inserta. Anth. albæ.

Stylus longus stamina æquans, stigma bicapitatum.

Ovarium biloculare, loculis 00 ovulatis, calyce connivente inclusum.

Hab. In umbrosis Madamaca : *no.* 232. *August,* 1834.

Lecananthus.

Suffrutex humilis vix uno pedalis. Caule basi forsan excepta 4-gona, angulis e stipulis decurrent magis acutis et elevatis ;

stipulæ membranaceæ magnæ oblongæ, infra medium centro carinato-alatæ. Fol. breve petiolatis ovato vel oblongo-lanceolata cuspidato-acuminata coriacea subtus albida 2 dariæ venæ arcuatæ.

Spicæ capituliform. axillares, livido-purpureæ horizontales, seu ½ cernuæ; surrounded by a peltately attached, subseveral-lobed involucre, os calycem bilabiata et inæqualiter tubæform.

Cor. bilabiata tubo infundibul. calyce paullo longior. the upper lip *in depressed* segments narrower, conspicuous uncinato-carinate parallel.

Lower 3 diverging, reflexed carinato-uncinate at the summits or deorsum.

Cal. of flower bilabiate, lab. inferior subintegro, superior 3-dentato majore often nearly entire. Stam. inserted about the centre of the tube, which is papillous, or at the back of the anthers hairy.

Style pilose. Stigma of 2 recurved, stout green lobes.

Ovary 2-celled, cells multo-ovulate. Placenta intrant fleshy.

Anth. adnate sublanceolate bilocular longitud. dehiscent.

Epigynous disk small entire.

Stout brown hair-like processes in the axilla of leaves, arising from the inside and edges of two liguliform axillary processes, or from axils direct; they cohere to the stipula bases.

Involucre at first, when only the peripherial flowers are developed—is campanulate.

Young fruit 2-celled, few seeded, terminated by the trumped-mouthed calyx.

Seeds angular, compressed, very few compared with the ovula.

Hab. Malacca. In sylvis densis Verrupha, called Aloor Gagah.

Obs. I imagine this approaches to Ophiorhiza, although according to DeCand. it would be Gardeniaceous, and Sarcocephalina. Flowers scarcely bracteolate, here and there setæ

like the axillary ones, only one expanded flower seen; this same when put in water for preservation during the night lost its bilabiate form, and became as nearly as possible regular, venation ordinary.

Evidently Lecananthus of Jack and agreeing with his L. rubescens, except in the regular corolla and smooth ovary.

Jack's generic character is not so good as ordinary.

Cal. tubulosus ore tubæformi bilabiato. Cor. valvata, bilabiata, laciniis subæqualibus, tubo infundibulif. Stam. medio tubo inserta, subsessilia inclusa. Ovarium bilocule, *placentis intrantibus carnosis*, (septo quasi affixis) ovula ∞. Stigmata 2, crassa, oblonga, subexserta.

It has nothing to do with Nauclea whatever; the ovarium is, while the tube of the calyx is beyond the limb, livid purple, the last is pubescent inside. Calyx well developed before the corolla.

Surrounding the internode *base* immediately next to inflorescence, is a sheath, the sheath of the gemma.

Rubiaceæ Pl. CCCCLXXIX. Fig. I.

Fructus in cymos terminales aggregatos dense congesti, baccat.

Baccæ obovatæ vel obovato-pyriformes, spongiosæ albi subdiaphanæ apice profunde foveolatæ. Calycisque dentis brunneis lanceolatis acuminatis connovente imbricatis coronatæ pseudo 4-loculares. Calycis parietis nempe a pericarpio secedentis nisi secus lineam septorum et utrinque placentis opposito.

Pericarpium biloculare membranaceum tenue, septis membranaceis discretis. Placentæ carnosæ stipitatæ his oppositæ.

Semina ∞, complanata irregulariter 4-angula brunneæ pulchre reticulata.

Tegumenta duplex utrinque adhærens exterius coriaceo-membranacea tenue e reticulatum brunneum, interius tenuiss. membranaceum album, albumen corneum.

Embryo obliquus hili latus unum oblique spectans. Radicula conica infera, cotyledones accumbentes seu faciebus angustiorib. seminis opposit. plano-convexæ. Plumula inconspicua.

Frutex 3-4 pedalis.

Hab. In sylvis, per totam regionem. Upper Assam vulgatim occurit.

SCÆVOLEÆ.

Scævola Taccada, Roxb.

Suffruticosa ramulis crassus, foliis alternis sessilibus obovatis carnosis læte viridibus, apices versus repando-dentat. *sinubus brunneis* supra nitidis. Cymis florum axillaribus paucifloribus, foliis multo breviorib. floribus majusculis albis demum brunneo-ochroleucis marginibus laciniarum basin versus et nervo medii tubique fissi, rubro-brunneis.

Pet. sinuato-repanda demissius ciliato-laciniat.

Anth. membrana terminat. Indusium e pilis albis.

Ovarium calycis dentibus coronat. biloculare, loculis 1-ovulat. ovulis erectis pericarp. drupaceum.

Hab. Mergue. In littorib. arenosis. Ins. parvæ prope ostium-lumen. Palar copiosa: *Oct.* 1834.—*Nov.* 1833.

It forms patches or belts of the most beautiful green I have ever seen.

STYLIDACEÆ.

Stylidium.

Stylidium Brunonis Gr.

Stylidium, caulibus basin versus incrassatus, foliis subrosaceis, spicis ramosis, floribus distantibus, foliis cellulosis inconspicue 3-nerviis.

Cal. bilabiat. 5-partitus $\frac{2}{3}$ labiis sublateralibus nec vere postico antico, lab. 2-fido sinistrorsum, 3-fido dextrorsum.

Cor. tubo brevi, limbo irregulariter 5-fido, lobo postico reflexo dentiforme, lateralia intermedia subtruncata, 2-inferiora majora, biloba.

Stigma papillosum. Sem. ovat. testa cellulosa.

HAB. Mergue.

SPHENOCLEACEÆ.

SPHENOCLEA.

Sphenocleæ sp.

A succulent marshy aunual with alternate exstipulate leaves, venation ordinary.

Flowers arranged in dense terminal capitula, sessile, tribracteate.

Cal. adhrent 5-lobed, imbricate quincunciate margins membranaceus, persistent unchanged.

Corolla small, 5-partite, laciniæ inflexed imbricate in æstivation ; venation simple, one central to each lacinia ending within the apex.

Stam. 5 opposite the sepals inserted into the tube towards its base, e vascular. Filaments short.

Anthers 2-locular, longitudinal, opening attached to the apex of the filament. Pollen smooth with 3 pores.

Ovar. entirely adhærent, 2-celled, ovules 00 antitropal.

Capsule crowned with sepals, which almost entirely cover its convex larger disc, style deciduous, 2-celled, seeds 00 testa shortly echinate membranaceo-coriaceous.

Albumen none. Embryo orthotropous.

Testa externally cellular, immersed bulging out into cones each of which is traversed from base to apex on both sides by a fibre.

The embryo separates with its integument probably the embryonary sac, this is furnisbed with a mammilliform process at either end, that next the hilum being the largest, the other represents its base, no raphe exists.

CAMPANULACEÆ.

Cyclocodon.

Cyclocodon distans Gr. Pl. CCCCLXXXI. Fig. I.

Caule subscandent ramoso rubro, articulis paulo incrassatis, fol. opposita breve petiolata lanceolata valde acuminata, mucronata serrata, 1-venia, venulis secondariis subarcuatis purpureo sæpe tinctis. Ramis apice trichotomis ramulis dichotomis, flore in furca solitario, in apicibus ramulor. sæpius 3-natim aggregatis. Pedicellis filiformibus rubris floribus albis carneo-tinctis.

Involucra 4-phyllum, patenti-reflexum, foliolis linearibus dentatis, interdum oblique insertis, verticillis nempe non formantibus.

Flos breve pedicellatus, pedicello fructifero parum elongato.

Calyx? ovario omnino adnatus truncatus obsolitus.

Cor. rotata epigyna 4-partita, laciniis cordatis acutiusculis 1-venus venulosis, æstivatione angulato valvata.

Stam. 4 epigyna laciniis corollinis alternantia, filam basi lata plana, filiformia demum marcescentia. Anth. oblongæ bases versus affixæ, biloculares introrsæ et longitudinaliter dehiscent. Pollen globosum minute hispidum, ovarii apex depressus concavus.

Stylus filiformis, pilosus, stigma 4-lobum lobus papillosis demum recurvis.

Ovarium adnatum omnino inferum 4-loculare loculis crucialí dispositis. Placentis carnosis bipartitis apicis versus liberis.

Ovula 00, oblonga foramen hilum prope. Tegumenta distincta 0.

Fructus capsularis subglobosus, apice depressus corollaque genitalibusque marcescent. coronat. 8-sulcatus, sulcis septis respondentibus, profundioribus, 4-loc. Placentæ 4 carnoso-fungosæ, loculos ex maxime parte replentes, apices versus liberæ, medio sulcatæ vix bipartitæ. Semina 00 valde compressa, subovalia, brunnea nitida. Tegument. simplex fragile, minute areolatum. Albumen carnosum farinaceum copiosum. Embryo minutiss. in axi albuminis. Radicula hilum versus spectans. Cotyledones parvæ, their faces corresponding to the greater diameter of the seed.

Septis ovarii petalis alternantibus, placentis carnosis succus lacteus parcus.

Hab. Khasyah Mountains. In sylvis Churra: *Oct.* 16*th*, 1835.

Obs. The above description is probably wrong, as the involucrum is most likely calyx, although the fact of the tube of the corolla being adnate to the ovarium, while the calyx is free, is an anomaly of extremely rare occurrence.

In my Mergue species, C. adnata, Gr. the involucrum is adnate to the base of the ovary.

Campanula.

1. *Campanulæ* sp.

Herba 4 uncialis annua in arenosis proveniens, fol. sessilia linearia obtusiuscula subdentata, flores pauci longiusculi pedunculati.

Calycis tubus lævis obconicus.

Cor. profunde 5-partita, pallide cærulea, filamenta pubescentia.

Antheræ stigmataque tria albida hæc revoluta.

Hab. Upper Assam. In arenosia. Deboro Mookb: *Feb.* 28*th*, 1836.

Unicum specimen. tantum vidi. Inter Jorhauth et Gubroo copiosa invenitur.

2. *Campanulæ* sp. Pl. CCCCLXXXIII. Fig. 2.

Planta annua in arenosis crescens.

Caulis angulato sulcatus simplex vel subramosus, ramis nanis.

Cor. carneæ.

Occurit etiam in cultis Chykwar Assamicæ superioris. Nam Tenai and Meinkhoon : *March 25th*, 1837.

3. *Campanulæ* sp. Pl. CCCCLXXXIII. Fig. 1.

Planta in arenis vel inter saxa fluminum crescens vulgatim occurrit, secus Brahmapoutram, Nam Tooroon et Nam Tennai.

Delvi apud Meinkhoon : *March 25th*, 1837.

CODONOPSIS.

1. *Codonopsis albiflora.*

Sub scandens erectave herbacea, caulibus ramisque teretibus petiolis brevibus basi dilatatis, fol. sæpissime opposita aliquando subopposita, lanceolato-acuminata dentato-serrata, basi subcordata, tenera floribus terminalibus et ex axillis folior. 2 summorum solitariis majusculis albis pedicellis elongatis, foliis brevior. infra florem sed supra medium 2 bracteata, bracteis linearibus dentatis, foliaceis sæpius oppositis.

Cal. tubo sub o basi planus 4-5 partitus laciniis linearib. elongatis serratis, bracteis consimilibus, æstivatio aperta.

Cor. subcampanulata. tubo brevi viridescent ovario adnato ! 4-5 partita, laciniis subcordatis vel late ovatis, acutis æstivatione valvatis *marginibus prominentibus*.

Stam. 4-5 epigyna libera, laciniis corollæ alternant. inclusa, filam. complanata basibus dilatat. Anth. erectæ subsagittat. bilocul ælongit. dehiscentes *introrsæ*. Pollen rotundat. hispidulum album.

Stylus 1 brevis, cylindricus apice versus pilifer. Stigmata 5.6 oblonga crassa patente erecta.

Ovar. 5-6 loculare vel loculi tot quot styli, loculis 00 ovulatis, ovulis placentis intrantibus carnosis affixis, foramen hilum prope.

Fructus capsularis calyce laciniisque persistentibus stipatis, laciniis corollinis subdeciduis ideoque quasi truncatus videtur filamenta bases persistenti inflexæ, stylo apiculato 5-6 locularis.

Placentæ albæ carnosæ si 5, *bifidæ*, sem. 00, minuta. Testa brunnea pulchre reticulata, albumen farinac. Embryo minutus axilis orthotrop. Semin. immatur. vidi.

Hab. Mergue. In cleared ground about Banlaw and Yengboo : *no.* 1013, *Feb.* 1835.

Obs. The limits of the calyx are well defined in the fruit by a line passing between the permanent laciniæ, hence the tube of the corolla is either adhærent to the ovary, although this is not demonstrable, or else the corolla is epigynous. In the bud however, the middle nervure is distinctly prolonged to the calyx, and the adherent part is so similar to the free, that I have but little doubt that such is the case. The existence of two layers is not demonstrable by a transverse section, if such is the case it is a *singular* instance of an ovarium united both to the calyx and corolla, to the latter in a much greater degree.

2. *Codonopsis* sp.

Scandens volubilis, foliis canis cordato-ovatis basi subreniformibus mollibus e rugosulis, fructibus axillaribus breve pedunculatis nutantibus. Pedunculis rubris basin versus, apice cæruleo-purpureis.

Calyx reflexus, laciniis foliaceis lanceolato-oblongis minute venulosis purpureis, depress. basi cæruleo purpureo, fructibus cujus basi calyx adnatus globosus truncatus apice cicatric. corollæ 5-augulatæ notat. et areolata, areola 5-angularia superfice saturato purpureo cæruleo, cæsio areola cujus majore magis rubescent. nitida, cicatrices stamina angulis

alternantibus, basis styli ex medio areolæ prominula conum referens.

Fructus pseudo-baccatus pericarpii parietes tenues carnosi, 5-locularis. Placentæ maximæ carnosæ transversæ, loculos fere replentes, septis axin versus distantibus nec approximatis, faciebus intrantibus internis basi fructus versus papillosis.

Semina 00 minuta, tota superficiei placentarum bases versus interne tantum excepte, ovalia minute punctulata foveolato more, pilo brevissim. apicule filiforme, testa subcoriacea crassiusculi subsimplex.

Albumen carnosum a tripliusculum. Embryo axiliis. Radicula longiuscula subulato-conica hilum spectans. Cotyledones carnosæ minutæ plano-convexiusculæ.

Hab. Khasyah Mountains Bogapanee: *Nov. 5th*, 1835.

3. *Codonopsis* sp. Pl. CCCCLXXXII.

Scandens volubilisque, foliis utrinque canescentibus, floribus pendulis magnis campanulatis viridibus, laciniis reflexsopatentibus margine sanguineis. Calycis sepalis semitortis reflexis.

Stigmata margines subconnates. Planta subfætida elegans.

Hab. In fruticetis muflong. *Itinerary Notes*, p. 56, *no.* 886.

LOBÊLIACEÆ.

Lobelia.

Lobelia.

Caulibus 4-gonis, sub 4-alatus decumbent. ramosis tenuis, foliis breviss. petiolatis cordatis serratis acutis basi 3-nervus, floribus axillaribus solitariis longe pedicellatis inconspicuis pallide cæruleis, pedicellis foliis duplo longiorib. basi bibracteatis, bracteis foliaceis linearib.

Cal. tubus 10-striatus, 5-partitus laciniis lineari-subulatis erectis persistentibus, tubo *primum* longioribus.

Cor. calycis laciniis paulo longiore, later. superior (postice) longitudinaliter fissa, bilabiat ⅔-5 partit. laciniis æqualibus.

Stam. 5 ascendentia per rimam corollæ, filam. corollæ breviorib. liberis. Anth. inter se et cum stigmatæ cohærentæ brunneis, introrsæ biloculi longit. dehiscentes, connectivo parce piloso.

Stylus filiformis longit. filament. Stigma papilloso-capitat. filam. basin corollæ inserta, lacin. alternantia, basib. apicebusque pilosis. Anth. apiculatæ, apiculo albo. Pollen ovatum læve hinc longitudinaliter sulcatum.

Capsula bilocul. placentis carnosis intra locul. product, polysperma. Sem. 3-angularia apice dehiscence, valvis medio septiferis. Semina lucidis brunnea, testa membranacea, albumen parcum. Embryo minutus in axis albuminis.

Hab. Mergue. In aquosis, *Oct.* 1834. *no.* 429. Succus aquosus.

HYDROLEACEÆ.

Nama.

Nama zelanica.

Planta prostrata, floribus pulchre cyaneis læta.

Calyx ad basin fere 5-partit. extus piloso-glandulosus. Sepala demum conniventia fructum includentiæ.

Cor. rotata, tubo brevi laciniæ 5 profundæ oblongæ.

Stam. 5 basin corollæ inserta cum petalis alternantia. Filamenta subulata basi dilatata.

Antheræ subsagittatæ magnæ, basin affixæ, connectivo angusto, loculis teretibus divisum, infra insertionem antheræ longe productæ biloculi introrsæ, longitudine dehiscentes, sæpe difformes.

Ovarium extus pilosum rotundatum, biloculare. Placentæ binæ carnosæ magnæ.

Ovula 00 transversa funiculo brevi affixa, foramin vix evident. sursum spectant. tegumentis coalitis.

Styli 2 filiformes crassi cyanei.

Stigmata subcapitata papillosa.

Septam ovarii bilamellata, mesocarpio intus inflexo, tenuissimo, demum in placentam partem carnosum ampliatissimo.

Capsula membranacea, calyce connivente incluso.

Semina 00, transversa ovato-oblonga, minuta pallida brunnea, exalbuminosa.

Tegumenta bina, exterius membranaceum, tenuissime cellulosum, cellulis punctatis.

Interius membranaceum, apice quasi mamillatum (nucleare) videtur trabeculatum, an affixum exteriori ope punctis ?

Embryo orthotropus, radicula teres, obtusiuscula. Cotyledones *planiusculæ convexo*-accumbentes vel faciebus seminis alternantes ? Plumula inconspicua.

Alternation and situation of parts, see Pl. CCCCLXXXI. Fig. II.

Hab. Assam. Jorhauth : *March 4th*, 1836.

CONVOLVULACEÆ.

Erycibe.

1. *Erycibe ferruginosa* Gr.

Frutex scandens, ramis, petiolis, paniculisque, calycibus corollarumque nervis ferrugineo-pillosis, foliis alternis aliquando suboppositis breviter petiolatis obovatis acutis integris, superne atro-viridibus infra subglaucis. Paniculis terminalibus, racemosis, bracteis bracteatisque villosis. Pedicellis brevib. dense ferrugineo-villosis.

Cal. basin fere, 5-partit. sepalis rotundatis ciliatis.

Cor. gamopet. tubo calycis longitudinis limbo, 5-lobo, lobis obcuneatis, bifidis parte ovatis ad fissum currento in æstivationem externa, dorso ferrugineo-villosa et incrassata.

Stam. 5 fauci inserta, petalis alternantia, introrsa, subsessilia. Anth. biloculæ longit. dehiscentes, apiculatæ. Stylus 0, stigma capitat.

Ovarium globosum 1-loculare. Placenta basilaris libera

inconspicua, ovula 4, an semper ? erecta radicula hilum versus, flores odorati, pallide ochroleuci. Æstivatio calyces quincuncialis nempe 2 externis, 2 internis, 1 intermedia. Petalorum partes villosæ valvatim dispositæ, externæ partibus membranaceis omnino alternes plicato-convolutis.

Hab. In sylvis Mergui: *August*, 1834. *no.* 175.

2. *Erycibe citriniflora* Gr.

Fruticosa scandens, fol. breve petiolatis oblongo-obovatis subrepandis obtusis, coriaceis subglabris. Racemis confertis abbreviatis in axillis sæpius folior lapsor. densis pedunculis pedicellis bracteolis, sepalis extus corollæque parte per estivat. extima rufo-pubescent, floribus majusculis læte citrinis odore ingrato sinapsis nigri.

Sepalis obtusiss.

Cor. laciniæ bilobæ, lobis post anthesin conduplicat.

Fila. complanata per brevia, corollæ leviter adnata. Anth. sagittatæ.

Ovar. pilis crebris tectum. Stylus brevissim. stigma magnum capitatum angulato. Ovar 1-loculare, 4-ovulat.

Hab. Mergue. In sylvis Mergue. *Jan.* 1835.

Convolvulus.

C. lupulifolia.

Scandens, volubilis caulibus glabris parceque pilosis, foliis inferior palmatim, 7-lobis summis 5 tantum cordatis, dentatis, lobo terminali majore, pedunculis axillaribus 3-5 floris, foliis breviorib.

Calycis sepalis submembranaceis, exteriore purpurascenti exteriore pilis longis hispido.

Cor. campanulata plicata, majuscula læte luteo. Stigma bicapitát.

Ovarium 4-loculare, loculis 2-ovulat.

Hab. Borasso juniore scandens Mergue: *Dec.* 1833.

NEUROPELTIS.

Neuropeltis intermedia Gr.

Cal. nitide ferrugineo-velutina.

Cor. alba, parte plicatâ angustissime ideoque nervo medii latissimo ferrugineo-pubescens, rotato-campanulata, tubo breviss. laciniis 5, ovatis patulis.

Stam. exserta, filam. basi villosa, alba. Ovar. pilosum medium infra miniat. glandulosumque. Styli 2, stigma 2, reniformi-capitata maxime lobulata.

Ovar. loculis 2-ovulatis ovulis erectis.

HAB. In sylvis inter Mergue et Kulweng: *December* 1834. *no.* 720.

Neuropeltis bracteata.

Frutex scandens, fol. alternis exstipulatis petiolatis ovatis vel lanceolato-ovatis integris mucronatis, glabris. Racemis axillaribus, foliis brevioribus ferrugineo-velutinis, floribus inferior in medium bracteæ foliaceæ ovatæ sessilibus, pedicello nempe hinc adnato, superior bractea libera lanceolata suffultis.

Cal. 5-sepalis, sepalis subcarinatis, ferrugineo-pilosis lanceolatis, margine utrinque producta membranacea, æstivatione imbricata.

Cor. gamopetala, profunde 5-partito, post anthesin connivens.

Stam. tot quot laciniæ corollæ et iis alterna, sinubus inserta, filam. filiformia, basibus pilorum fasciculis stipatis.

Anth. biloculæ longit. lateraliterque dehiscentes, versalitis.

Ovarium bilocul. loculis 1-ovulatis, ovulis erectis. Stylus.?

HAB. In sylvis, *no.* 679. Mergue: *Nov.* 1834. Vid. post anthesin tantum. Nec Erycibe petalis nempe integris. Habitus hujus generis.

Nemodon. Gen. Nov.

Volubilis hirsuta, fol. cordatis 3-lobatis integrisve. Racemis abbreviatis axillaribus. Bracteis membranaceis hispidis, floribus ochroleucis corollis urceolatis plicatis calycibus hispidissimis 5-sepalis, sepalis 2 paulo minoribus.

Cor. tubo inflato, calycis longitud. fauce constricta, limbo plicato obsoleto-5-lobo, lobis emarginatis.

Stam. 5 corollæ ima basin cohærentia libera, filam. basibus dilatissim, parte dilatata superne in processum dentiform. inter convexum, pilis glandulosis purpureis hispida et ovario incumbent. producto, subulata. Anth. subsagittatæ.

Stylus subulatus, inclusus. Pollen globosum hispidum album. Stigmata 2 capitata urceolus glandulosus ovarium ambiens. Ovarium 2-loculare, loculis 2-ovulatis, ovulis erectis.

Hab. Mergue. In graminosis prope : *Dec.* 1834. *no.* 813.

Ipomæa.

Ipomæa noctiflora

Glabra caule volubila, foliis longe petiolatis cordatis acuminatis cum mucronum subrepandis, floribus racemosis maximis albis suavissima odoratis pedunculis petiolis paulo breviorib. axillaribus, pedicellis uncialibus, crassis.

Cal. 5-sepalus, sepalis 2 exterior et 1 intermedio apice mucrone erecto.

Cor. tubo longiss. limbo hypocraterif. marcescente involuta.

Stam. 5, tubo inserta inæqualia. Pollen hispid.

Stigma capit. bilobum lobis e lobulis papillosis formatis.

Torus in cupulam glandulosa ovarii basin cingens abiens.

Ovarium 4-loculare, loculis, 1-spermis.

Hab. Mrs. Hutton's garden Mergue, Floret, noctu : *July, August*, 1834.

STYRACINEÆ.

Styrax.

Styrax floribunda.

Arbuscula gracilis, pubescentia stellari brevi velutina, fol. alternis linearis exstipulatis ovatis acuminatis subcrenatis plus minus ciliatis racemis paucifloris axillaribus terminalisque. Pedicellis basi 1-bracteatis, bractea lineari-subulata floribus nutantibus majusculis albis suave odoratis.

Cal. campanulat. basi ovario adnato, limbo erecto breviter 5-6 dentato, alternantia.

Cor. gamopetala, tubo calycino tubo longitud. campanulata, limbo profunde 5-6 partita, laciniis lanceolatis reflexis, dentibus alternant. æstivatione imbricatis.

Stam. laciniis corollinis numero duplo sub-biserialia serie externa petalis, inter sepalis opposit. fauci inserta, libera. Filam. filiforme pubescent. Anth. erectæ exsertæ, lineari-oblongæ, connectivo carnoso magno loculis linearibus longitudinaliter introrsumque dehiscent. plus minus pubescent velutinis. Pollen ovatum læve hinc sulcat.

Stylus filiformis, stamina superans. Stigma trigonum capitat.

Ovar. seminiferum, 3-loculare, loculis pluri-ovulatis. Ovulis placentis axilibus affixis ascendentibus, foramen inferum hilum prope.

Hab. In sylvis. Inter Kulweng et Mergue: *April*, 1835.

Styrax grandiflora, Pl. CCCCXXII.

Arbuscula, ligno albo duro, close grained. Ramuli cinereo-brunnea, novelli pubescentes fusco-viridescentes, fol. reticulata saturato-viridia, subtus pallidiora, venis subdiaphanis. Calyx et pedicellus pubescentes cano-viridescent. Flores albi odorato, raro 4-fida. Filam. alba connect. albid. Anth. luteæ. Stylus stigma album.

Hab. Naga mountains between Burmah and Assam. In sylvis prope Namtuzceh: *March*, 1837. Nempea: *March* 19*th*, 1837.

EBENACEÆ.

Diospyros.

1 *Diospyros* sp.

Gemmæ (apertæ ferrugineo-sericeæ). Folia lanceolato vel oblongo-ovata obtuse et breviter cuspidata basi subattenuata, non coriacea reticulata, long. 4-5 unciali, lat. 1½-2 uncialia.

Fructus solitarii sessiles in ramos. subhorizontales.

Calyx tubus obconicus crassus magnus limbo 4-fido, marginibus insigniter reflexis. Fructus ipse ovatis long. fere uncialis, lat. 8-9 lineales, apice adpressa ferrugineo-pilosus et apiculatus breviter; epicarp. præcoriaceum duriusculum, pulpa copiosiuscula fluida mucilaginosa arctu fibris percursa, 6-sperma, long. 6-7 lineal. lat. extrem. 3-4.

Semina pendula compressa, tegumen. exterius gelatinosum, interius pallide brunnescens marginatum, albumen arcte adhærens densum cartilagineum. Embryo in axi dimidii superioris, radicula longa, bilinealis clavata; cotyledones foliaceæ lanceolatæ longitudine circiter radiculæ.

Succus subdulcis, astringens.

Hab. Malacca at Ching Nhinghull: *January* 27*th*, 1845.

2 *Diospyros argenteus* Gr.

Gemmæ lanceolati-acuminatæ argenteæ imbricatæ breve stipitatæ.

Ramuli compressiusculi et tota pars novella, pagina super. foliorum excepta, nitidissima argenteo-sericea, demumque ferrugineo-argentea vetusta, folia plus minus glabrata subtus et glauca.

Petioli subbilineales, Folia e basi cordata lineari-oblonga, breviter cuspidata, long. 10-uncial. latit. 3-uncial. integra, bifaria, supra nitentia, subcoriacea, reticulationes obscure, venis secondariis irregularibus parum conspicuis.

Fructus axillares fere subsessiles, basi 1-bracteata, calyce 4-sepalo, sep. maximis oblongis, concavis, obtusis (lustre really metallic) extus argentissime sericeis intus venosis, long. 17-18 lineas, lat. 10-11 metientem. F. ipse oviformis 2 unciali et 5 lin. long. lat. 1½ uncial strigossissime pilis virides-centi-albidis breve cuspidatus stylo base (epicarpio vel cuticula viridi homogenea albo-cellulosa except immatura) 8-loculares.

Semina 6 subcylindric. utrinque paullo attenuata, longitudine fere fructus tegumentum album cellulosum. Albumen cartilagineum. Embryo in superum partem albuminis.

Radicula clavata crassa. Cotyledones oblongæ 3½ lineales, longitudine circiter radiculæ.

D. discolori aff. foliatione.

Hab. Malacca: *January 27th*, 1845.

2. ***Diospyros embryopteris.***

Arborea dioica, fol. oblongis obtusis coriaceis integerrimis, reticulatis, marginibus cartilaginosis. Paniculis e ramis vetustioribus ortis vel terminalibus cymosis, cymis secundis, 3-chotomis, sæpiusque 3-floris. floribus majusculis ochroleucis suaviter odoratis. Pedunculis pedicellis calycibusque extus, bracteisque, atro-ferrugineo pubescent.

Cal. 4-5 dentata, dentibus subovatis sæpius acutis.

Cor. urceolato-campanulata, imbricata, 4-fido, laciniis subcordatis revolutis, æstivat.?

Stam. indefinite hypogyna. Filam. libera breviss. Anth. adnatæ bilocul. longit. dehiscens, apiculo papilloso emarginato integrove. Connectiv. utrinque præsertim intus piloso. Rud. ovarium central.

Hab. Ad littoram Insular. alibique circa Mergue, vulgate occurrit. Amherst ad littoram arenosam: *Dec.* 1834.

Sideroxylum.

Sideroxylum obovatum.

Arbuscula, ramulis angulatis brunneo-velutinis, fol. obovato junior subtus ferrugineo-integris, floribus capitulatis, axillaribus, parvis albis. Pedicellis basi minute 1-bracteat.

Sepal. 5, subinæqualia rotundata imbricata.

Cor. rotata, 5-partita, laciniæ rotundatæ, sinubus squamiferis, squamis subcarnosis plus minus laciniatis.

Stam. 5 epipetali e laciniis corollinis oppositi, filam. subulat. Anth. subversat. bilocul. longit. lateraliterque dehiscentes.

Discus hypogynus glandulosus lutescens, crenulato-repandus, superum pilifera, pilis pallide ferrugineis ovarium cingit.

Stylus brevis subpentagonis. Stigma lineat. Ovar. 5-loculare, loculis 1-ovulatis, ovula medio affixa, foramen superum?

Hab. Mergue. Apud Bopeem. *no.* 1102.

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1. *Ebenaceæ.*

Arbuscula dioica ramis albidis cinereis, foliis alternis exstipulatis, breve petiolatis elliptico-ovatis integris, obtuse acuminatis, glabris penninervus, luteo viridibus. Paniculis carnosis subhæmisphæricis, axillaribus, breve pubescent. foliis breviorib. Bracteis minimis, floribus numerossissimis parvis albis odoratis, in pedicellorum apices articulat.

Cal. parvus, breviter 3-4 dentat. dentibus rotundatis.

Cor. urceolato tubo subgloboso 3-4 dentata, dentibus erectis marginibus recurvis lutis, rotundatisque æstivatione imbricatis.

Stam. circiter 13-20, hypogyna biserialia libera, corollæ imæ basin leviter cohærentia.

Anth. ovatæ acutæ papillosæ, apices versus bilocul. lateraliter dehiscent. Connectivum majusculum, filam filiformia subplana interioris breviora.

Pollen oblongo-ovatum læve hinc sulcatum. Rud. ovarii centrale, lobatum angulatum.

Hab. Inter arbusculos circa Mergui: *no.* 175. *Dec.* 1834. Fæm. nondum vidi.

2. *Ebenaceæ.*

Frutex dioicus 8-10 pedalis, ramulis flexuosis virgatis, fol. alternis exstipulatis lanceolatis, obtuse acuminatis integris subrepandis penninervus, nervis secondariis, margines versus confluent. floribus axillaribus solitariis vel 2-3 racemosis secundis, inconspicuis, lutescent, pedicellis brevibus basi bibracteatisve.

Cal. ad basin usque fere 4 parta, laciniis foliaceis ovatis, marginibus extrorse curvatis.

Cor. hypocraterif. tubo 4-gono, conico subulato, nempe, apicem versus alternato, calycem fere duplo excedent. limbo 5-partito, laciniis ovatis reflexis æstivatione contortis! Sepalis alternantibus.

Stam. circiter 14-16 hypogyna? basin corollæ adnata cuique separabile, filam. filiform, valde inæqualia flexuosa. Anth. erectæ subadnatæ inclusæ apiculatæ biloculi longit. dehiscentes, inclusæ. Rud. fæm. *0.*

Hab. Mergue. In sylvis densis collis Pator prope basin *no.* 984. *Feb.* 1834.

An genus Nov. certe non Diospyrum species legitima.

Interdum monstros. coadit. Corolla in verticel. foliosum 4-foliis calycines.

SAPOTEÆ.

Sapotea.

Sapateæ sp. Pl. DI.

Arbuscula vel arbor.

Ramuli virides.

Fol. subopposita subcoriacea saturato-viridia subtus pallida, venis secondariis distinctis arcuatis suboppositis.

Petioli subteretes viridescentes.

Paniculæ axillares virides, flores fasciculati directione varii ochroleuci, fortiter odorati.

Calyx viridescens demum brunnescentis.

Gemmæ squamatæ terminales brunneæ. Ovar. superum biloculare, ovulis solitariis ascendentibus.

Habitus Sapindacearum.

Hab. Burmah. Namyoon: *March* 10*th*, 1837.

Isonandra.

Isonandra hexandra.

Ramuli teretiusculi pallide brunnescentes. Gemmæ ferrugineæ. Petiole subunciales a medio circiter infra incrassata et e sulcata; lamina oblongo-lanceolata, breviter et obtuse cuspidata patentia subundulata, long. 5-6 uncialis, lat. 2-2½ uncialia: v. secondariæ arcuatæ inferne venules transversis anastomosantes nexæ.

Flores plures in axillis aggregati, glomeruli evolutione irregulares, forsan subinversa nutantes vel nutante penduli, mediocres viridescente albidi, odore subingrato. Pedicellis sub 3-uncial. basi bracteis squamiformibus ferrugineo-puberulis interspersis, subclavatis. Æstivotio saltem sepal 3 interior leviter imbricata.

Calyx tubo cupuliformis, ad medium tripartitus, pubescens sub ferruginescens, sepala 3 interiora: omnia cordato-ovata.

Corolla rotata, tubo brevi obconica lamina, 6-partita laciniis lanceolatis concavis obtusis patentibus.

Stam. numero pet. duplo, fauci inserta, filamenta pilosiuscula subulata, his petalis opposita longiora. Antheræ erectæ sagittatæ mucronato-aristatæ, extrorsæ, biloc. longit. dehiscent.

Pollen immersum ellipticum triplicatum, plicis medio porosis.

Ovarium minutum subrotundum, 6-loculare. Stylus subulatis albus, alabastra etiam apice exsert. paullo longior petalis.

Stigma simplex. Ovula in loculis solitaria, pendula anatropa tegument 0.

Hab. Malacca Nhinghull.

Ison. hexandra Gr. fl. haxandris, fol. oblongo-lanceol.

Obs. The diminution in size of the stamina opposite the sepals, which ought to be the largest, is in accordance with the character of the order.

There is another hexandrous species here.

Ison obovatis Gr. foliis obovata subtus glaucescentia punctatisque, alabastrus ferruginea, antheris ferrugineo-villosis.

Malacca: January 30*th*, 1845.

MYRSINACEÆ.

Embelia.

Embeliæ sp.

Frutex erectus, 6-8 pedalis. Rami divergentis, glabris flexuosa, teretes. Fol. alterna ovato-lanceolata, acuminata repanda, penninervia utrinque glabra, seniora subspinoso-dentata, petiolata. Petioli $\frac{1}{2}$ uncialis. Paniculi florum axillares, terminalesque, ramulis divaricatis. Flores parvi albi, odore prussico.

Cal. basi $\frac{2}{3}$ bracteatus, 5-partitus laciniis cordatis obtusis tubo brevi.

Cor. rotata, 5-partita, laciniis rotundatis crenato-repandis.

Stam. 5-paullo infra faucem inserta. Filam. petalis opposita vix exserta filiformia. Anth. ovato-rotundæ, adnatæ bilocul. longitudinaliter dehis. Pollen ovatum leve, longitudinaliter sulcatum.

Stylus brevis, stigma 3-4 fid. inclusum.

Ovar. 1-loculare. Placenta libera centralia. Ovula plura, complanata vix peltata?

Bractea lanceolata ad basin cujusque pedicell. æstivatio calycis imbricata. Pl. DXLVIII. Fig. *e.* part of the placenta and ovula.

Hab. In sylvis circa Moulmain copiosa. *Dec. Jan.* 1834.

ÆGICERAS.

Ægiceras fragrans.

Arbuscula, glabra. Ramuli teretes, Folia sparsa, petiolata obovata, obtusissima, integerrima, coriacea, 1-nervia. Flores umbellati, albi odorati, umbellæ sessiles, axillares vel terminales et tunc oppositifoliæ, paucifloræ.

Pedicelli filiformes elongati.

Cal. 5-sepalus, sepalis ovatis membranaceis (basibus carnosis) oblique imbricatis, potius ? arcte contortis.

Cor. gamopetala, hypogyna, hypocrateriformis, tubus calycis longitudinis, limbus profunde 5-partitus, laciniæ ovatæ acutæ, demum reflexæ ! decidua, æstivatio contorta.

Stam. tot quot petala et iis opposita. Filam. subulata exserta, basi in annulum corollæ, basin adnatum accreta *annulus*, (potius cupula) pubescens.

(Faux corollæ dense pubescens tubus *glanduloso pubescens*, pubescentia nempe glandulis capitata.

Anth. basibus emarginatis, affixæ, subversatiles, bilocul. longitudinaliter dehiscentes. Loculi parietes crassi-cellulosis,

Ovarium 1-loculare, *ovula* 00, placenta carnosa centrali immersa.

Stylus subulatus crassiusculus rubro-punctatus. *Stigma* simplex. *Ovula* ascendentia, inferiora, transversa.

Hab. In limosis ad ripas fluvum Martabaneæ inter Rhizophoras copiosa. Florens. *Feb.* 1834.

The ovules are not peltate, the upper are ascending, the lower transverse, the foramen is near the hilum, it is by the greater subsequent development of the part in which the foramen is situated that the seed becomes peltate. The immersed glands are indistinct.

Pl. DXLVIII. Fig. *a.*

Longitudinal slice of placenta, and the ovula before the expansion of the flowers, shewing x, x, the situation of the hilum and o, o, the foramen.

Moulmein: *Feb.* 1834.

Edgeworthia.

Edgeworthia, Pl. CCCCXCVIII.

Arbuscula vel arbor. parva, interdum inermis, ramulisque sæpius in spinis fortibus abeuntibus et dense ad pressque albo-pubescent. Fol. alternis, obovatis obtusis, integerrimis coriaceis, patentibus vel sæpius deflexis, dispositione valde varius siccatione margine reflexis, v. secondariis distinctiusculis inter venius minute indistincti reticulatis. Petiolis brevibus, subtus glaucescent. Flores odorati. Bracteola minuta sepalis consimilis subflorem quemque vix semper. Floribus in axillis aggregatis subsessilibus.

Cal. imbricat. 5-sepalum, ferruginis hirtus.

Cor. monopetala, lutescens, tubo brevissimo laciniis 5 reflexis, æstivat. imbricatis.

Stam. 10 fauci inserta ; 5 sterilia interiora sepalis opposita reflexa, e basi subsagittata, acuminatiss. ochroleuca lutesc. colore corollæ ; 5 fertilia exteriora, petalis opposita eodem colore.

Filam. subulata longa per æstivat. apicibus geniculatum inflexis nunquam recta ficent ! Antheræ basi affixæ oblongæ biloculares extrorsæ ! præcocius dehiscentes. Sterilia fauci inserta ! fertilia in basi laciniarum. Pollen oblongæ glabum 1-3 plicat.

Ovar. ovatum, pilis rigidis vestit. basin solidum, apicem versus uniloculare, rudimentis septis tenuissimis ? an semper ?

Sericei si solitarium globosum, castaneo brunneum, pisi majoris magnitudine, si dua (rarissime) hemispherica secus facies adpressus, lineis elevatis 3-5 (an rapheos ramulis) notat.

Tegument. exterius coriaceo-chartacea.

Tegument. interius tenuissimum cellulosum, plerumque e *vasculis* conformatum.

Tegument. intimum tenuissimum ? albumini adnatum.

Albumen copiosum, carnosum, ruminatum, tegmentis duobus exterioribus.

Embryo axilis curvatus, radicula longa micropylem (nota luteola hilum prope sine ulla elevatione) distinctam spectans.

Cotyledones foliaceæ, raphe oppositæ.

Raphe seminis globos in nulla exterius discernenda, *vasa* testæ partem intimam verisimiliter dispositæ, et sacculus embryonarius absorptus?

Stylus e basi attenuatis e medio circiter oblique ascendens vasc. fasc. 3-5.

Stigma terminal. punctiforme, canal. stigmat. simplex, *i. e.* termin. ovula pauca, 5-7 erecta, tegmentis cum nucleo concretis, foramine inconspicuo prope hilum, et extus spectans, raphe ramosa.

Fecundatio præcocio, stylus nempe exalbastro cito exseritur et longe ante stam. dehiscent.

The corolla is slight monopetalous, the lines marking the separation of the sepals extending below the sinuses nearly to the base of the tube, and there diverging from each other, so that it is entirely bound together by the sterile stamina, which extend outside to the base of the tube. The relative situation of the sterile and barren stamina appears viewing the corolla unopened to be the reverse of what it should be, but when the corolla is laid open, there is a certain prominence down the tube, along the course of the filaments, that leads me to believe that their exterior situation is due to the adhesion being carried up beyond its usual limits. The sterile stamina are vascular.

There would appear to be a tendency in this plant to rupture of the ovary. In the two instances I have seen, and in which the rupture, judging from the margins, and the width of the rupture, was of considerable standing; the young seed was as perfect in its development, as in the normal state. This rupture from the appearance of the margins is scarcely to be attributed to insects.

The embryonary sac is a large fleshy transparent sac, curved in the direction of the seed, its surface is undulated,—the first steps to its rumination, so that in

this instance the membrane inflected into the albumen will be partly at least nucleary. The stalk of the embryo is exceedingly large, the largest I have met with, it is worthy of remark that, at its apex it is very laxly cellular, the tissue gradually becoming more condensed as it approaches the embryo, still no part of the radicle is formed from it.

This is obviously a transition genus, between Myrsineæ and Sapotaceæ, with a preponderation perhaps of characters in favour of the former where it is placed by Dr. Falconer. The relative affinity it has with the two above orders may be decided in favor of Myrsineæ, on account of its habit and inflorescence, which is like that of Myrsinea. It probably comes close to Jacquinia.

The inflexion of the filament is a curious character, the anthers however return to their usual direction, (is this the case in Melastomaceæ ?)

The protrusion of the style, at so early a period is unusual, it is not united with a correspondingly early dehiscence of the anthers, but it is perhaps ? associated with the late expansion of the corolla, which forms a tube round the style.

It would appear that fecundation is unusual, although fruit is produced in immense quantities, but their quantity compared with that of the flowers is extremely small, and seldom more than 2 young fruits are to be found in an axilla.

The order Myrsineæ appears to me unnatural, nor can I think otherwise, viewing such genera as Ardisia united with Myrsinea, but I know few of the plant it contains.

The calyx is entirely that of Sapoteæ.

Cal. 5 sepalus. Cor. subrotata, laciniis reflexis, stam. sterilia 5, fertilia 5, lacinia basibus insert. æstivation imbricat. filam. inflex. ovar. *unilocul.* placenta sub 0. Ovulis erectis, anatropis.

Semen unicum, album, corneum ruminatum. Embryo axilis

curvat. cotyled. foliaceis, radicula longa. Frutex sæpius spinosus, fol. obovatis coriaceis, floribus aggregatis in axillis.

Bæobotrys.

Bæobotrys indica Roxb. Pl. D. Fig. II.

1, 2. Alabastra shewing the æstivation.
3. Flower expanded.
4. Do. longit. section.
5. Diagram of alternation.
6. Anther outer view.
7. Do. inner.
8. Do. lateral.
9. Do. after dehiscence.
10. Pollen dry.
11. In water $\frac{1}{250}$.
12. Calyx and ovarium or pistillum.
13. Do. longit. section.
14. Placenta.
15. Ovulum,

Hab. Naga mountains at Yoomsan : *Feb.* 28*th*, 1837.

The outer series of stamina is wanting, and no trace of it to be found, is the epigynous disk a modification ? Stigmata 5 generally combined in two, 5 distinct vascular fascicles of style 5.

Choripetalum.

1. *Choripetali* sp. Pl. CCCCXCIX.

Frutex scandens.

Paniculis basi fucescent. cæterum uti flores canescenti-viridibus, flores odorati.

Folia supra secus costam irregulariter glandulosa.

Hab. Patkaye Mountains between *Assam* and Burmah. Inter Nidding et Culleyang. Delvi : *March* 23*rd*, 1837.

2. *Choripetali* sp. Pl. D. Fig. 1.

Mas. fl. albido-virides.

Hab. Mishmee mountains.

PRIMULACEÆ.

Primulaceæ. Affghan.

Calyx campanulat. ad medium 5-partit. villosiuscul.

Cor. hypocraterif. tubo calyce vix longior subcylindrac. laciniis 5 oblongo-obtusis venosis, faux annulo carnoso, semiclausa.

Stam. inclusæ, medium circiter tubo insertæ, filam breviuscula filiformia. Anth. introrsæ magnæ albæ bilocul. longit. dehiscens, venæ corollæ 10, alternis ad sinus currentibus after forming the annulus, it then becomes Brunonian.

Capsula bilocularis, inclusa calyce, valvis bipartitis vel bifidis. Placenta compressa, post dehiscent. lobato.

Semina 2? like Oncidium, rugosa brunnea, intus cochleata.

Primula.

1. *Primulaceæ* sp. Pl. CCCCLXXXV. Fig. 1. Itinerary Notes, p. 123, *no*. 396.

Hab. Tassyasen Bootan. *Feb*. 11*th*, 1838.

2. *Primulaceæ* sp. Pl. CCCCLXXXV. Fig. 2. Itinerary Notes, p. 135, *no*. 582.

Hab. Bootan. Tassyasen. *Feb*. 11*th*, 1838. Young leaves and calyx farinaceous.

Lysimachea.

Lysimacheæ sp. Pl. CCCCLXXXIV.

Herba spithamæa vel minor aspectu omnino Cruciferarum quarumdam floribus albis, corolla profunde 5-partita, antheris albidis.

Hab. Burmah. In campis versus Carmein. Delvi ad Carmein: *April* 2*nd*, 1837.

VACCINACEÆ.

Vaccinium.

Vaccinii sp. Pl. DXVII. Itinerary Notes, p. 23, *no.* 363.

Hab. Khasyah mountains; *Churra Ponjee*: *Sep.* 28*th*, 1837.

Gaultheria.

1. *Gaultheriæ* sp. Pl. DXVII A. Itinerary Notes, p. 125, *no.* 430.

Hab. Bootan at Bailfai.

2. *Gaultheriæ* sp. Pl. DXVIII. Fig. II. Itinerary Notes, p. 58, *no.* 897.

Hab. Khasyah mountains *Muflong*: *Oct.* 8*th*, 1837.

Gaylussacia.

1. *Gaylussacia serrata*, Gr. Pl. DVII.

Hab. Bootan at Bhoomlungtung.

2. *Gaylussacia incurvata*, Gr. Pl. DVI.

Hab. Khasyah mountains at Amwee : Nov. 7th, 1837. Itinerary Notes, p. 84, *no.* 1217.

Thibaudia.

1. *Thibaudia auriculata*, Gr. Pl. DVIII.

Hab. Bootan. Itinerary Notes, p. 124, *no.* 429.

2. *Thibaudia retusa*, Gr. Pl. DIX.

1. Bud.
2. Vernation.
3. Genitalia in situ.
4, 5, 6. Stamina.
7. Stamina in a very young state.

8. Do. more advanced.
9. Pollen.
10. Pistillum.
11. Ovary transverse section of.
12. Portion of a placenta.
13. Ovulum.

The dorsal processes are growths from the connectivum, this I think is shewn by their similarity in structure with this, by their situation which is not on one locellus, but between the two, and by both locelli being obviously prolonged into the simple membranous termination.

Hab. Bootan. Itinerary Notes, p. 153, *no.* 756.

3. *Thibaudia myrtifolia*, Gr. Pl. DX.

Hab. Bailfai in Bootan : *January* 28*th*, 1838.

4. *Thibaudia gaultherifolia*, Gr. Pl. DXII.

Hab. Bootan at Tasangsee. Itinerary Notes, p. 136, *no.* 590.

5. *Thibaudia revoluta*, Gr. Pl. DXIII.

Hab. Bootan at Tongsa. Itinerary Notes, p. 152, *no.* 752.

6. *Thibaudia glabra*, Gr. Pl. DXIV. Itinerary Notes, p. 84, *no.* 1218.

Hab. Khasyah mountains.

7. *Thibaudia* sp. Pl. DXIVA.

Hab. Khasyah mountains *Muflong : Oct. 7th*, 1837.

8. *Thibaudia obliqua*, Gr. Pl. DXV. Itinerary Notes, p. 30, *no.* 478.

Hab. Khasyah mountains ; Churra Ponjee : *Sept.* 30*th*, 1837.

9. *Thibaudia camelifolia*, Gr. Pl. DXVI. Itinerary Notes, p. 61, *no.* 928.

Hab. Khasyah mountains ; *Myrung* : *Oct.* 11*th*, 1837.

Ceratostema.

1. *Ceratostema angulatum*, Gr. Pl. DIII.

Frutex.

Rami angulata ramulique cinerea.

Petioli pallide fuscescentes.

Fol. subcoriacea, infra luteo-viridia, costa albida supra saturata viridia, ven. secundariæ tantum conspicuosulæ.

Pedicelli clavato sanguineo-rubri, calyx viridescens sanguineo-tinctus.

Cor. campanulata, laciniæ reflexæ, carnea hyalina, sanguineo-venosa, more C. variegata.

Hab. Khussee Kyoung : *March* 16*th*, 1837. Patkaye mountains, Journey from Assam to Ava.

2. *Ceratostema miniatum*, Gr. Pl. DIV.

Frutex epiphyticus subscandens, fol. supra atro-viridia venis secondarius conspicuis subtus pallidis.

Squamæ gemmarum brunneæ.

Racemi abbreviati fusco-rubescentes, bracteæ ferrugineo-brunneæ.

Corolla miniata acuta 5-angula, genitalia inclusa. Calyx longit. rugosus, purpureo miniat. uti pedicellus.

Hab. Summit of the Patkaye mountains, alt. 4500 ft. Journey from Assam. to Ava: *March* 6*th*, 1837.

3. *Ceratostema variegatum*. Pl. DII.

Frutex epiphyticus ut omnes species.

Radicula apicem versus valde incrassates subfusiformis.

Fol. luteo-viridia subtus pallida.

Racemi abbreviati penduli sæpius e parte caulis vetusta viridis, bracteolæ minute brunneæ.

Pedicellus basin viridis cæterum sub sanguineus.

Cor. in alabastro 5-angulata, tubo demum sub rotundata, laciniis reflexis læta sed pallide viridibus. Anth. cornubus

semi exsertis lutescent. Stigma hæc superans. Discus epigynus albidus.

Hab. Naga Mountains, Journey from Assam to Ava: *March*, 1837.

4. *Ceratostema nanum*, Gr. Pl. DV.

Frutex nanus, foliis lanceolatis angusti-integris margine recurvatis. Racemis elongatis, pedicelli apice fimbriato.

Hab. In collibus Nagensibus prope Lainkaran: *March*, 1837.

Hujus generis nunc species plures mihi notæ sunt, quarum binæ e collibus Khasiensibus, tres e Mishmeensibus et circiter 6 e collibus Nagensibus proveniunt, una sola floribus solitariis et foliis suborbicularibus gaudet. C. Wightianum mihi Mss. specieum omnuim. C. vaccinaceum tantum collium pedes versus invenitur.

Delvi Nempeum: Journey from Assam to Ava: *March* 20*th*, 1837.

ERICACEÆ.

Rhododendron.

1. *Rhododendron* sp. Pl. DXVIII. Fig. I. Itinerary Notes, p. 190, *no.* 1016.

Hab. Bootan, alt. 8000 ft.

2. *Rhododendron deflexum*, Gr. Pl. DXIX. Itinerary Notes, p. 192, *no.* 1046. Private Journal, p. 290.

3. *Rhododendron macranthum*, Pl. DXX.

Hab. Tongse Bootan.

4. *Rhododendron* sp. DXXI.

Hab. Bootan at Tongsa: *March* 13*th*, 1838.

5. *Rhododendron oblongum*, Gr. Pl. DXXII. Itinerary Notes, p. 192, *no.* 1045. Private Journal, p. 290.

Hab. Bootan.

MONOTROPACEÆ.

Monotropa.

Monotropa sp. Pl. DXXIII. Fig. I. Itinerary Notes, p. 38, *no.* 629.

MENISPERMACEÆ.

Roxburgh's Menispermeæ in his unpublished Mss. drawings in the Library Bot. Garden.

M. heteroclitum Vol. 15, t. 55. is very distinct in the male organs, the females do not seem remarkable.

Stamina plurima monadelphia vel columna staminum apice multi locellata, squamæ 0!!

M. fenestratum Vol. 15, t. 54. exceedingly resembles Phytocrene, but has the wood of Menispermum, the female heads are scarcely distinguishable from those of Phytocrene, it is remarkable for ruminate albumen.

Fl. fæmin. capitat. albumen *(e cavum)* ruminatum.

M. polycarpon, Vol. 15, t. 57. Tiliacora, is also distinct in the form of the stamens, the many ovaria, and fruits, which are not curved, the embryo is not represented, it comes close to Anonaceæ.

Filam. gracilia subulata. Anth. terminalis. Ovaria plura. Drupa e cava.

M. cordifolium 15, t. 51.
— verrucosum „ t. 53.
— hirsutum „ t. 56.
— laurifolium suppt. 5. t. 20.
— Columba „ 5. t. 22,
} Appear genuine.

M. hexagynum may be distinct, but it seems to differ chiefly in 3 additional Pistilla.

M. tormentosum 15, t. 52, has capitate stigmata.

Clypea.

Clypea, Pl. CCCCXCVII. Fig. II.

Suffrutex dioicus scandens volubilis, minute pubescens, mucilagine effætus.

Fol. longe petiolata, oblonga, basi hastata, acuminata, grosse serrata, glabra, carnosa, basi 5-venia, subtus pallida, vernatione involutiva. Juniora utrinque brunneo-punctata et infra ad venas pubescenti-pilosa.

Cymi plures aliquoties dichotomi, paullo supra axillares, (petiolis 3-4 uncialibus teretibus) breviores, corymbosi multiflori. Divisiones basi bractea setacei suffultæ. Pedicelli breviusculi basi bracteati.

Flores minuti, nutantes, viridescenti-lutescentes.

Sepala 6-serie duplici, æstivatione imbricata, oblonga, apice rotundata, dorso pilosa.

Petala totidem duplici serie, sepalis opposita, spathulata, carnosa, margine media supra membranacea, dentatoque, 1-venia, vena mediatenus currens.

Stam. monadelpha, columna clavata, apice rotundato-clavatis, fasciculis vasorum 3 præcursa.

Antheræ 6 biseriatæ, petales oppositæ, 3 inferiores exterioribus, 3 superiores interioribus oppositæ 4-loculares! transverse subvalvatim dehiscentes, valvis siccatione quam maxime contractis.

Pollen rotundato-angulatum album majusculum læve.

Rud. fæm. nullum.

Hab. Upper Assam. In sylvis, Suddyah, marem tantum hucusque vidi.

Proxim. Cissampeli, discrepans numero ternario, petalis distinctis, antherisque bilocularibus et quodammodo habitu.

Cuticula e cellulis irregularibus varia angulatis infera tantum stomatosa, stomata inæqualia, ovata parva, disco opaco.

Caulis constat. e parenchymata, laxiusculo rotundato, 6-gono, cellulæ systema vasculosum et fibrosum versus minimæ.

Systema vasculosum peripheria approximata, partibus subhæmisphæricis alternatim majusculis, minimisque, hisque exterioribus, nuperioribusque.

Vasa fibris circumcincta irregularia pauca, extima maxima, intima minima. Vasa intima spiralia et annulata, interme-

dia majora, ductus solubilis fibra composita nec ne; exteriora e cellules punctates superimposites; Fibræ punctatæ.

Systema cellulosum laxissimum hæmisphæricum extrorsum adjectum.

Systema fibros. peripher. prope, continuum, ex arcubus pluribus systematibus vasculosis oppositis constans, arcus convex. extrorsum spectant. Distinctio corticis parenchymatisque obsoleta.

2. *Clypeæ* sp. Pl. CCCCXCII. Itinerary Notes, p. 35, *no.* 581.

Hab. Bootan.

Cocculus.

1. *Cocculus convolvulaceus.*

Volubilis glaber. caulis teres, spiraliter lineatus.

Folia cordata, aliquando cordato-rotunda, acuminata cuspidatis integerr. basi 7-nervia, subtus glauca et reticulata. Petioli ½ pollici longi, basi latiores, et sublobati.

Inflorescentia fasciculato-racemosa. Racemis axillares basi articulati foliis longiores.

Flores in fasciculis 4-5 florum dispositi ad basin cujusque fasciculi bractea linearis decidua. Flores lutei, ingrati odoris.

Sepala 3 ovato-lanceolata ima basi discreta.

Pet. 3 sepalis, 4 duplo majora, et iis alterna, oblonga patentia marginibus recurvis.

Stamina 6 hypogyna, biserialia, seriei externa sepalis, interna petalis opposita. Filamenta clavata. Antheræ extrorsæ, bilocul. longitudin. dehiscentes. Squama stipitata, limbo rotundo-obovata, filamenta cujusque externe basin suffultiens.

Rudiment fæm. vel nullam vel imperfectum, concavo-convexum latus concavum ovulum imperfectum gerens.

Char. specif. C. foliis cordatis, acuminato cuspidatis 7-nerviis utrinque glabris, subtus glaucis reticulatisque pedunculis masculis axillaribus, subcompositis, folio longioribus.

Obs. It is more agreeable to the laws of organisation to refer the outer series to the calyx, the inner to the corolla.

I think the fact of the stamens being distinctly in two series, (and consequently their corresponding squamæ or pet. D. C. being so) disproves the idea of the squamæ being petals. Petals are usually situated between the calyx and the stamina, these scales are thus arranged—3 scales, 3 stamens. Taking them for petals, we have the following anomalous arrangement. A calyx of 6 sepals situated on two distinct planes, 3 petals, with three stamens and 3 petals, 3 stamens. If they are petals the stamina do not appear to be hypogynous, but periginous, universally separating with the scales.

I observed an imperfect development of the ovarium in some male flowers.

2. *Cocculus nudiflorus.*

Caulib. scandent. volubil. carnosis. Fol. 0. Racemis ex axillis folior. lapsor. 3-4 uncial. multifloris erectis. Pedicellis basi bracteatis, floribus majusculis fusco-viridibus.

Sepal. 3 minuti, ovati. Pet. 3 iis alternant. multo majore, patentia. Squamæ 6 hypogyna petaloideæ quorum 3 exteriore majore, sepalis opposita, 2 interior minore petalis marginibus basin versus involutis.

Rud. stam. 6, hypogyna, breviss. setacea, squamis opposita, apicibus obtuse conicis.

Carpella 3 distincta, toro dilatato elevato insidentia, sepalis opposita.

Stylus crassus breviss. Stigma subreniforme repandum, 1-loculare, 1-ovulat. ovula pendulo ab apicem locule versus, foramen hilum prope super. Tegument. ovuli simplex.

Hab. In sepib. Mergue: *March,* 1835. Masem legi apud Motow sed nex exminandum: *Feb.* 1835.

Obs. The stem presents two separate systems of wood, the outer fibrous disposed in arches, the ends of which communicate one with the other, the fibro vascular or inner, deposited in irregular bundles, near the pith; these bundles are quite distinct. Interposed between the two formations, is lax uncolor-

ed tissue. The whole tissue abounds in amylaceous granules of large size. The vessels are very large and as they are in Plytocrena.

3. *Cocculus villosus.*

Fruticosa dioica brunneo-pubescens. Ramis scandentibus, foliis alternis exstipulatis, petiolatis, elliptico-ovatis mucronatis, integris ciliatis reticulatis utrinque brunneo pubescentib. floribus in axillis aggregatis solitariis internisve in pedicellis, subnutant. inconspicuis viridibus.

Cal. bibracteolat. 3-sepalus, sepalis ovatis petalisque extus brunneo-pubescent.

Cor. 3 petal. pet ovalia subreflexa sepalis alternantia subcarnosa intus pilis albis sparsis.

Squamulæ hypog. 6 cuneato obovato subintegra, medio sulcatæ.

Stam. totidem hypog. squamulis opposita, biserialia, serie exter. sepalis opposita, interna petalis opposita, filam brevia subclavata connectivum carnosum. Anth. bilocul. loculis discretis medium versus dehiscent. Pollen ovatum leve hinc sulcatum. Æstivatio corollæ valvata.

Hab. In sylvis. Mergue: *Sept.* 1834.

Cessampelos.

In my remarks on the collection of Plants made at Suddyah, I pointed out under Menispermeæ, the variation in site of the placentary suture in Cissampelos from that which usually obtains. It is scarcely necessary for me to explain that it is a law to which no real exception is I believe known, that this suture is invariably next the axis.

This is most evident in those ovaria, which are formed by the coalition of several carpellary leaves, but although less evident, is as strictly true in those cases, in which the carpellary leaf, from whatever cause this may originate, stands alone. In such a case, its situation would be thus: see explanatory sketch, Pl. CCCCLXXXVI. Fig. II.

Indeed were it not so in case of additional carpella, being formed, it is at once evident, that the placentæ of these would have no tendency to meet in the centre, they would instead of all being directed towards the axis, be all directed towards the circumference. Upon these grounds the supposition, that in the plant referred to, the flowers produced from the axillæ of each bracte, form part and parcel of a single flower, is untenable, as will be at once seen by looking at the explanatory sketch, which represents the structure of Clypea. Pl. CCCCLXXXVI. Fig. II.

The supposition otherwise, considering that the female flowers are generally aggregated by fours, corresponding to the quaternary structure of the males, seemed not improbable.

But the true explanation has been offered to me by my valued friend Dr. Wight, and this is borne out by the consideration of the stigmata, to which I ought to have paid more attention. The stigmata of this genus appear to be invariably three, and we may take this as a proof that the ovary is solitary by abortion, of the three stigmata, the central one is external with reference to the axis, it is solitary by the abortion of the two lateral ovaries.

Granting these to become developed, the situation of the placenta will be natural: see sketch, *b* which points out what would be the situation of the placentæ of the lateral ovaries. Corresponding to this is the suppression of $\frac{2}{3}$, or generally $\frac{3}{3}$ of the parts entering into the composition of the Perianth.

1. *Cissampelos capitata* Gr.

Suffrutex volubilis pubescentia crispata præsertim folia subtus sublanata.

Caulis viridescens. Fol. peltata oblique cordato-ovata obtuse acuminata cum mucrone, ambitu deltoidea, subcoriacea integra, basi 9-venia, cæterum reticulata.

Petioluis uncialis biuncialisve teres axillæ gemmiferæ tan-

tum vel gemmiferæ floriferæque, gemma semper externa. Umbella petiolo brevior, simplex vel composita, radii inæquales, pedunculo breviores, basi bractea lineari suffulta centrale excepto.

Flores capitata, plures in quolibet capitulo, quorum centrali majora præcocioreque, sessiles, minute inconspicui, viridescentes, exteriores prius florentes, sæpissime nudi, irregulariter evoluti normaliter ternarium.

Sepala normaliter 3, spathulato-obovata pubescentia.

Petala totidem conformia sed majora.

Glandulæ 3 discretæ rotundato-cuneatæ carnosæ, glabræ, virides sepalis oppositæ.

Columna staminum petala subæquans cylindracea, apice dilatato plano. Antheræ 3, transverse circa caput columnæ sitæ, petalis oppositæ? transverse dehiscentes, ad anthesin una septis obsoletis confluentes, initio 4-locellatæ?

Pollen album, rotundato-angulatum læve.

Hab. Upper Assam. Suddyah in sylvis: *May* 26*th*, 1836.

Obs. Marem tantum vidi. Columnæ vasorum fasciculus unicus. Glandulæ mediatenus 1-veniæ. De situ staminum dubito judicare vix possible est ob septa obsoletissime sed ob analogiam conjicio petalis opposita esse, ideoque glandulis alternantum. Sepala petala, et glandulæ sæpe numero variæ. G. sæpissime ternæ.

C. capitata, foliis peltatis cordato-ovatis basi 9-venus, capitulis florum umbellatis, glandulis tribus.

2. *Cissampelos* sp. Pl. CCCCXCVII. Fig. III.

The female flowers consist of invariably of 4 ovaries, seated somewhat obliquely on the apices of as many pedicells. Their only envelope consists of a double scale, which is always situated externally, the inner being smaller and more rounded.

The usual explanation of this is I fancy that the flowers are quaternarily aggregate, the perianth of each being re-

duced to one sepal and one petal which is from its situation most likely a transformed stamen. There can be no doubt that both these answer to parts of the female perianth. The outer scale being obviously a sepal, the inner a part of the cup-shaped body, which from the alternation of the stamens with the sepals cannot be petals, but most probably results from a modification of the stamina. This is too perhaps the most natural way; but the occasional occurrence in the order of several carpella suggests an idea as to the *composition* of the flowers of Cissampelos. In this case we shall have 4 sepals, and 4 scales, and 4 ovaries.

The greatest arguments against this are the invariable greater development of the 2 posticous ovaria and the separation of the pedicel, which last seems to me nearly conclusive, the plurality of stigmata.

Those in its favour are the invariable quaternary aggregation of the flowers, and the situation of the scales, which seem never to be developed next the axis.

All these fine speculations are knocked on the head by the fact that the ventral suture is not next the axis. The first view is therefore the correct one.

Ovaria pilosa postica gibba, convexava sutura ventrali antica sita, 1-locularia, biovulata an semper ovula collateralia subantitropa, foramen superum, stylus cylindraceus, brevis, stigmata subtria, simplicia.

Sepalum unicum, anticum externumve pilosum, late obovatum.

Squamula subreniformis, huic opposita, carnosa evasculosa.

After fecundation the ovarium suddenly enlarges and alters its shape, becoming as it were curved on itself, the chief cause seems to be the elongation of the placenta, the style and pedicel are at length brought close together.

It is hardened somewhat by the time the embryo has appeared, its sac which previously existed soon disappearing.

The cotyledons at least in their very young state are opposite, the great transverse diameter or broader sides of the carpellum.

3. *Cissampelos convolvulacea var.* Pl. CCCCXCVI. Fig. II.

Caule ligneo gracile volubili pubescente, pubescens cana. Fol. petiolata reniformi-orbicularia cordatave late emarginata, pubescente, basi palmatim 5-nervia, quorum intermedia bifurcata medium infra. Paginæ aliter venulis reticulatim anastomosantibus occupatur centralis in mucronem excurrit. Petiolis filiformibus teretibus.

Paniculis terminalibus axillaribusque partialibus subcymosis, filiformibus, gracillimis villoso-canis, floribus herbaceis minutissimis. Alabastra subglobosa æstivatione imbricata.

Sepala 4 breviter unguiculata limbo, subdeltoideo cordato, integro crenulatove obtuso, dorso villoso venulis reticulata.

Discus cyathiformis parum profundum ore subintegro carnosus centrum floris occupat.

Stam. monadelpha, columna brevis cylindracea apice peltata. Antheræ 4 interdum plus minus coalitæ, circa apicem columnæ transverse dispositæ, sepalis alternantes transverse dispositæ, sepalis alternantes, transverse dehiscentes et per diametrum longiorem.

Pollen album læve, ovatum, medio sulcatum.

Rud. fæm. 0.

Hab. Upper Assam. Suddyah in sylvis: *January 8th*, 1836.

Vix dubito quin apetala sit et urceolusa aboriginem ducat. ut patet ex analogia et structura carnosa *cellulosa?* urceola.

The structure of the stem is remarkable enough, the centre is occupied by the pith which is green and from which several wedge-shaped broad rays radiate, these are green and again coalesce towards the circumference forming the integument or bark? The spaces existing between these rays are wedge-shaped and interiorly, and throughout their great-

er part are occupied by vascular tissue, consisting of large cells punctuated and placed end to end, and surrounded by dotted fibres. This stem is truncate on its outer edge. Immediately adjoining this is a mass of lax cellular tissue brown along its outer margin, which may have a different structure. There is still a small place left between this brown outwardly curved line and the mass formed by the coalescence of the rays, this is occupied by a small mass of woody fibre. I have recognised this curious structure in others of this tribe.

Lophophyllum Nov. Gen.

Lophophyllum bicristata Gr. Pl. CCCCXCI. Itinerary Notes, p. 165, *no.* 854.

1. Female flowers viewed in different directions.
2. One of the sepals viewed from within.
3. Do. with the ovary; this has no regular situation compared with the sepals, although it usually alternates with them, and as the sepals are usually right and left, one of the edges of the ovary is usually next the axis.
4. Pedicelli, two lateral cicatrices are those of the sepals, the terminal, of the ovary.
5. Abortive ovary, resembling much one of the sepals.
6. Oblique transverse section.
7. Pistillum.
8. Ovulum.
9. Pistillum.
10. Pistillum after fecundation, one sepal remains.
11. Ovulum of do., this represents I think the nucleus, the outer coat, distinct before fecundation having become intimately united to the wall of the cell; but on this point I require more observations.
12. Pistillum more advance.

13. Do. its longit. section, if the above idea be right the inner smooth subdiaphanonous portion is testa.
14. Do. more advanced, nucleus? much curved, its cavity very distinct, no embryonary sac as yet formed.

Hab. Bootan.

Obs. Allied to Cissampelos, but distinct by the binary sepals (each with a cuculate bracte) and single ovarium.

Menispermum.

Menispermum triandrum, Pl. CCCCXCVII. Fig. I.

Pedicelli florum hirti, subclavati. Flores minuti, urceolati.

Bracteæ 3 oblongæ, ...
Sepala 3 basi carnosa, oblongo-ovata, } margine hispidul.
subcarinata, ...

Petala 3, 3-4 majora, ovato-rotundata, præcarnosa, concava æstivatione valvato, dorso et margine hispidula.

Squamæ 6, biseriatæ, inclusæ, exteriores 3 majores, sæpius emarginatæ, interiores petales oppositæ sæpius truncatæ.

Stam. 3, squamis exterioribus opposit. Filamenta clavata carnosa, supra medium interiora facie sulcata. Anthera biloculares longitud. dehiscent. confined to the rounded apex of the filament. Pollen globosum (in aqua saltem) minutum, 3-plicatum vel 3 poros. Rudim. stam. 0.

Suffrutex scandens ut plurimum glaber. folia lanceolato-ovata repanda, acuminata, reticulata. Petioli teretes subunciales. Racemi vel paniculæ axillares, sæpius foliis breviores, (panicularum antheris irregularis.)

Female not seen, the male flowers in October.

The innermost 3 stamina so usually developed, and which would then be opposite to the smaller scales are suppressed.

The valvate æstivation to be kept in mind, as also shape of flower and relative size of parts.

1. Flower.
2. Do. one petal removed.
3. Petals removed scales stamina and sepals in situ.
4. Petal inner face.
5. Stamen and its scale back view.
6. Smaller scale.
7. Stamen in front.
8. Do. back shews its vascularity.
9. Young stamen front.
10. „ laterally.
11. „ dorsally.
12. Pollen $\frac{1}{20}$ Achrom.
13. Partium situs et alternantio.

2. ***Menispermum dioicum.***

Scandens, suffrutex dioica.

Caulib. teretib. velutinis. foliis alternis breviter petiolat. ovatis coriaceis glabris reticulatis.

Floribus fæm. racemosis, lutescent. racemis paucifloris, supra axillarib.

Per. 4 sepalum. Cor. 4 petala, petalis reflexis. Stam. 0. sed cornuum loco corp. petaloidea 4, petalis alternantis. Carpella 2, vel ovarium didymum. Stigmata? papillosa carpella 1-locularia, 1-ovulat. ovulo pendulo erecto foramen ad apicem.

Hab. Mergue. In sylvis Begtown: *August*, 1834.

3. ***Menispermea***, Pl. CCCCXCIV. Fig. II.

Frutex scandens, cortice succo lacteo effæt. striata. Radiis medullariis amplis.

Rami novelli ferrugineo-puberuli.

Folia alterna ex stipulata ovato-oblonga cuspidato-acuminata integra, supra lucida, subtus pallidiora basi 5-venia, venis lateralibus, supra indistinctis, secondariis apicem arcuatum nexis sed inconspicua, pagina cæterum areolata.

Stomata?

Vasa lactifera folior. longissima tenuissima!!

Petioli utrinque incrassati-digitatis juniores ferrugineo-puberuli, demum glabrati, striati.

Fructus in racemos densos, oblongis pedalibus pendulis e caulis partibus senioribus foliis denudatis, pedicellata, in racemo articulata. Racemis solitariis vel aggregatis interdum oppositis.

Pedicelli breviusculi utrinque incrassata.

Fructus abortionem solitarium, sæpe et normaliter, ternim in dilatato pedicelli apicem articulati breviter stipitati, oblongim oleæ fructus magnitudinem, patentissime, obliquisculi, apicem versus puncto sphacelato (situm styli) notati intus longitudinaliter, sutura ventrali inconspicue lineati, virides glabres lucidi drupacei.

Pars carnose postice crassior quam maxime vasculosa, vasis lactiferis folior. similibus.

Endocarpio mediocri extus rugoso, extrorsum vel antice convexiusculo linea longitudinali centrali notato, introrsum vel posticum vel suturæ ventrali opposito concavo et centro apicem versus protuberantia parva medio perforato gerente, compresso, intus secus cursum rapheos canaliculato.

Semen pendulum cavitate drupæ exacte replens.

Tegumentum unicum, tenuissimum, membranaceum, sublente modice augente granulosum. Raphe crassa ampla semi-completa quam maxima vasculosa, per perforatione protuber. anteæ supra discriptæ intrans, sutura ventrali opposit **Chalaza inconspicua.**

Albumen copiosum carnosum, drupæ cavitat. conforme (igiturque sectio transverse per medium ducta reniformes.)

Embryo axilis albus. Radicula supera longiuscula, teres hilum prope, apicem extremam drupæ spectans. Cotyledones maximæ foliaceæ venosæ lateribus internis per oblique igitur-que parte tantum mutuo applicitæ.

Plumula inconspicua.

Proximum *no.* 4, quæ non drupaceus.

1. Fruit nat. size.
2. One drupe viewed on its ventral face.
3. Do. transverse section. } Nat. size.
4. Do. long section of fleshy portion, exposing the outer face.
5. Drupe, long section, through the smaller diameter.
6. Drupe separated inner face.
7. Do. outer. 8. Do. lateral. } Nat. size.
9. Long section of drupe through small diameter.
10. Seed separated viewed on its raphal face.
11. Portion of raphe and testa.
12. Portion of testa $\frac{1}{20}$ granulations aften resembling stomata.
13. Long section of seed through the greater diameter, or opposite the raphe.
14. Embryo, raphal face of.
15. Do. dorsum.
16. Do. one cotyledon removed, shewing that they are opposite in their extention, and that their partial correspondence is owing to the obliquity of their inner margins.
17. Young embryo.
18. Do. viewed edge-ways.

Hab. Upper Assam. Suddyah in sylvis: *August* 26*th*, 1836.

4. *Menispermea*, Pl. CCCCLXXXVI. Fig. III.

Suffrutex scandens, foliis alternis, oblongo-lanceolatis, breviter cuspidatis, integris subcoriaceis supra lucidis, paulo basin supra 3-veniis, v. secundariæ distinctæ paucæ, pagina cæterum reticulata. Inflorescentia ut patet e fructus dispositione paniculata.

Fructus compositus vel abortione simplex in pedunculo $\frac{1}{2}$ unciali utrinque incrassato, ovalis vel ovali-ellipticus viridis lævis, ovi *pidgeon* magnitudine, subsessilis apice depressus ad situm styli basis, secus faciem interna quoad axin, longitudi-

naliter lineatus, succus viscosus vel potius mucilaginosus, odor forte. Pericarp carnosum demum baccatum? Endocarpio albo membranaceo. 1-loculare, 1-spermum. Semen magnum, cavitat. pericarpium conforme, eoque secus lacturam ventralem affixum, cochleiforme, hilo nempe profunde excavato, albumen copiosum albumen carnosum superne hili apicem versus papilla obsoleta notatum. Tegumenta tenuissimum, facile non delegendum. Embryo inversus in axi albuminis. Radicula supera, brevissima. Cotyledones maximæ planæ foliacea oblongæ basi profunde cordatæ, stipatatæ. Plumula inconspicua cotyledones curvatum hippocrepidiformem albuminis sequuntur.

Cotyledones nec parallelæ sed mutuo oblique sitæ secus marginem internos irregulares, tantum cordatæ, lateri exteriori vel potius auriculatæ.

Hab. Upper Assam. In sylvis Kujooque Thea indigena invenitur: *Jan.* 17*th*, 1836.

Of this I have examined 2 fruits, but I should like to determine which cotyledon is external and indeed more of their structure. I have little hesitation in referring it to Menispermeæ from which it chiefly differs in the large size of the cotyledons, and in the position of the radicle; but the foramen in the ovulum may be inferior.

5. *Menispermeæ*, Pl. CCCCXCIV. Fig. I.

Frutex tenuis volubilis scandens, breviter pubescens.

Fol. reniformia, vel cordata obtusissime vel acuta olim acuminata etiam subemarginata mucronata obsolete peltata, basi peltata 7-venia, supra sublucida, infra albida, interveniis minute reticulatis.

Petiolis basi subarticulatis, teretes diametr. transvers. folii majoremque vix æquantes.

Cymis paniculatis axillaribus, aggregatis ideoque summis upra axillaribus, petiolos subæquantibus ramis divaricatis ramulis paucifloris, flore terminali prius evoluto, ferrugineo pubescentibus.

Flores masculi minuti, viridescenti lutei basi 1-bracteolati.

Sepala 3-minutissima, irregularia linearia spathulatave.

Petala (vel series interior perianth) 3-obovata unguiculata, lutescentia, parce pubescentia.

Squamæ 6, biseriatæ, seriei exteriori sepalis opposita paulloque majora, interiori petalis ovata concava marginibus nempe involutis.

Stamina 5, hypogyna squamis opposita, eodem more biseriata. Filamenta distincta basi connata filiformia valde crassa, apices versus extrorsum curvata. Antheræ terminales erectæ basi affixæ, biloculares longitud. lateraliter dehiscentes brunnescentes extrorsæ. Pollen lanceolatum hinc sulcatum, sulco uno pluri. Rud. fæminei ne minimum quidem.

Cuticula e cellulis sinuosis, his paginæ superioris estomatosæ majoribus.

Anatomia. Caulis, medulla laxa, peripheria versus arctior. Radiis medullaris magnis viridescent cum cortice continuis. Vasa spiralia medullam ambiunt. Systema vasculosa cæterum e cellulis punctatis mutuo applicitis end to end, circumdatis fibris punctatis. Vasa centrum versus multo majora, ideoque fibræ multo pauciores, forma systematis hujus partes plerumque obcuneiforme.

Spata reliqua arcuum radiis medullaris peripherice convexorum occupatur tela cellulosa laxa distinctissima e cellulis quadratis.

Systema fibrosa densum e fibris impunctatis applicitur arcu cuique peripherice, hujus partes componentes minimæ sunt.

Cortex interspatia arcuum radiorum medullarium non omnino implet.

Hab. Assam. In sylvis Cheikwar: *April 8th*, 1836.

PHYTOCRENE.

1. *Phytocrene stylocarpa*, Gr. Pl. CCCCLXXXIX.

Fructus aggregatus interdum capitis humanifere magnitudine, breve pedunculatus et quasi sessilis in ramo.

Drupæ plurimæ oblongæ, subparallelogrammicæ sulcato-angulatæ, sæpius compressæ, $2\frac{1}{2}$ unc. long. 1-$1\frac{1}{2}$ lat. apice depresso, stylum proficiente basi cincta et sæpe cuspidata, perigonio albido membranaceo ad medium 4-partito.

Superficies, pilis deflexis acutissimis rigidis e basi oblonga pilos alios plures multo minores gerente ortum ducentibus et terminantibus. Substantia, dimidium superius solidum, firmum, fibris percursum inferius, exterior pars tenue firma, intus carnosa fibrosa, putamini adhærens.

Putamen quasi pendulum, ovatum vel lanceolatum, sæpius compressum, pulpa gelatinosa vestitum basi excepto qua abrasum, osseum, crassum, fragile, scrobiculatum, utrinque ad apicem emarginatum, apicis quasi *hili bi-ocellatum*, sæpe hilum versus utrinque lineis 2 parum prominulis cito evanidis notatum, brunneum, intus albido-ochroleucum et papillis subhæmisphæricis rugosum.

Semen solitarium (nondum licuit ovulum alterum detegere) pendulum conforme. Tegumentum tenuissimum membranaceum, raphe $1\frac{1}{2}$ completa lineata, sæpe e maxima parte albumine obtecta.

Albumen e lobulis innumeris conflatum, carnoso-oleosum cæseinum, odoris ingrate, lutescens. Embryonis cotyledones sigmoideo duplo flexæ, foliaceæ, ochroleucæ. Radicula brevis, magna, supera.

The putamen might easily be taken for the seed, for the pulp, except at the base, separates apparently, evenly and smoothly; but the raphe on the membrance covering the tegument shews the real nature, setting aside observations on the young fruits.

Of two specimens one had the drupes more elongated and

less compressed, the others a good deal compressed and about ovate.

The albumen of these presented generally the lobes in partial state of separation, and then much more rounded, indeed they appeared as though they were stuck on the outer faces of the cotyledons in a single row, in these too, the integument was often interrupted in continuity, and occasionally nearly floccose.

The margins of the cotyledons are often not covered with albumen: the albumen adheres to the surface.

In the ovate seeds, the integument seems to dip here and there under the albumen, but this is due to the form of the seed, and only occurs along the lines of flexure.

The structure of the albumen is like that of the Olacineous Mergue plant; but the tegument in that is highly vascular, and the inflexion really takes place to a great extent.

1. Fruit natural size.
2. Drupe with the perianth at the base.
2*a*. Ditto without the perianth.
3. Long section, the outer part of the seminiferous part pulled away from the pulp, not cut.
4. Putamen detached.
5. One of the more elongated ditto.
6. Putamen, pulp rubbed off.
7. Ditto laid open to expose the seed.
8. Long section of seed.
9. Transverse.
10. One, often more elongate seeds.
11. Transverse section of the same.

Hab. Penang.

Phytocrene stylocarpa? semina, Pl. CCCCLXXXIX. Fig. II.

Pyrena Putamen received in June 1843 from Dr. Cantor. Ovatum compressum versus hilum or attachment, where it

is distinctly two edged, and on the broad veiws presents 2 or 3 costæ, the surface is punctulate the seed loose side.

The putamen is thick and long, and very hard outside, inside irregular roundish elevations (corresponding to puncta ?) Seed of the same shape attached to the end of the putamen on which the mark of attachment is, on one side is an irregular nearly closed up foveola along one of the broad faces. The albumen is lobed, the lobes are so pressed together as to appear mere areola, and almost naked, but there are traces of a very fine integument which passes probably between the lobes.

2. *Phytocrene macrocarpa* Gr. Pls. CCCCLXXXVII, and Pl. CCCCLXXXVIII.

Frutex scandens robustus, caule præsertim in part. novel. aculeato, aculei conico sine ordine. P. novellæ, sicut ramuli ferrugineo-tomentosa, tomento *strigis* immixto.

Fol. alterna, exstipulata Menispermaceo-Artocarpina.

Petioli teretes, (of old leaves immersed at the base into a deep foveola in the stem) 1 ½-3 inch. basi incrassati, foliaque præsertim subtus ad venas ferrugineo-pubescentia.

Lamina coriaceo-profunde cordata, apice emarginata integriuscula, subundulata, supra tactu asperula, venis basin palmatis, 7 ; 2 intermediis branched on the outer side, these branches as well as the primary ones, inosculate by arches interwoven, with reticulate veins prominent below.

Some irregular white spots above, scattered strigose hairs above, pubescence underneath stellate.

Peduncles in the specimen 3, (appearing to originate from a protuberance on which are the scales,) axillary base surrounded with brown linear subulate scales or bractes, very strigose hairs subpungent subferruginous, otherwise greenish.

Capituli of flowers, oblong or nearly spherical, greenish from the perianth, otherwise brown from prominent Pistilla. There do not appear to be any bractes.

Perianths both tetramerous, the outer of 4 spathulate slightly concave scales, densely covered with white straight hairs outside. Inner 4-partite, herbaceo-fleshy segments, patento-reflexed at the apex, hairs like the outer ones on the back except at the base inside which is smooth, perhaps valvate in æstivation.

No rudiments of stamina.

Ovary strigose.

Style scarcely any, or style 3-partite, segments revolute reflexed outside hairy and inside stigmatic channelled.

Stigmata 3, 1-ceteris majus, uniloculare. Ovula 2, (1 abortiens) anatropa pendula no distinction of teguments, solid, no embryo sac, I could make nothing out of the barren ovule. The ovula in the young fecundated state, I take to be campylotropous; although I cannot reconcile this with the subsequent appearance of the seed. In the specimen the ovaria are generally fecundated and hence enlarged, in the abortive ones, the pistilla is of the length of the inner perianth, which is partite below the middle, and easily separates into its constituent portions.

The stigmata are often two in which case they are nearly equal, except the hairs, all the parts of these are black.

Fructus (immaturus) in the specimen solitarius, (capitulis aliis abortivis) pendula maximus, capitis humanis magnitudine (very heavy) e carpellis plurimis, apice angulatis more Nipæ vel Pandani quodammodo conflatus.

Fruc. proprii ambitu cuneato-obovati, in the exposed parts greyish-green, in the appressed pinkish, very strigose with deflexed sticking, but scarcely pungent hairs, deeply furrowed sides, apex angular analogous to Nipa. When very immature, cellular fleshy with many fibres, along these on a long section mucilaginous matter is thrown out, this is the prevalent secretion of the plant. The walls of the single cell smooth, with small spot-like eminences here and there; from the immature specimens, it may probably be drupaceous, indeed the apex is already hardened.

Seed, one, pendulous, compressed, raphe ½ complete, linear simple. Tegument single lax spongy cellular, the young albumen copious.

Radicle broad flattened furrowed, superior, longit. (quoad fruit) shorter than tegument, which towards apex is entirely spongy cellular, adhering here to the albumen.

Cotyledons very small, suborbicular, on the same plane with the raphe, which appears simple ⅔ complete.

Hab. It was brought in from B. Brouang, nom. Malayan vere *Akur Pisang Pisang*, the seeds (or fruit) are eaten by natives.

Obs. It is easily distinguished from the Ayer Punnus species, by the shape of the leaves, and the immense fruit and differs from Wallich's P. gigantea which has the outer perianth united at least in the male.

That may be called *Callicarpa*, this *Macrocarpa*.

Its affinities are obviously near those of Menispermeæ, it is perhaps analogous to some Urticeæ, out of flower no one would know it from the former family. (N. B. Examine the Assam climber which I take to be Natsiatum.)

It is abundantly distinct however in the capitulate flowers, in the binary double perianth, and concrete compound pistilla, each with 2 ovula as well as in the structure of the wood, and especially that of the pith.

In the edible seed? it assimilates to Artocarpus, and in the inner perianth to some Uticeæ, particularly if the stamina be opposite the segments.

In the branches on which leaves are frequent, and the petioles are not inserted into foveoli, which I take to be annual, the pith is large, consisting of firm closely packed roundish cells, containing a few adherent granules, its cells become smaller outwardly. Transverse section of the pith, consists of truncated cylinders short, applied end to end.

It is surrounded by true ligneous tissue, with large tubular openings here and there, and distinctly striate, its outline is irregularly angular.

Between this and the bark is occupied chiefly by cellular tissue, angular muriform towards the wood, hence roundish, but towards the bark it is irregular.

In this in the sinuses of the angles of the *wood* appears the parallelogrammic plates, and between these and the bark, but *all round*, is a formation of young fibrous tissue, the commencement of the next true wood.

Parallel plates of membranous impunctate tubes! each surrounded by highly punctuated fibres of considerable diameter occurs; of the extent of these membranes I know nothing, and sometimes they are partly punctuate. Their presence is confirmed by the transverse section of the other species made by my friend Mr. J. W. Grant, C. S. sometimes the membranous tubes have here and there no interposed fibres.

In the main, or larger branches, there is a distinct ring round the pith, the truncated cylinders of which are now beautifully punctuated. This ring is not visible on a thin transvere section, it is continuous with the wood, than which it is less tubular, but has no line of demacration.

Then comes the former wood with 8 radiating lobes, owing to the parallelogrammic plates, which appear now nearly to reach the pith, but the new formed part, is, I think, or will be wood, from its presenting largish perforations. The new formed outer part of each plate has a whitish cellular appearance very different from that of the old.

The white cellular tissue,—the ground work of the structure, presents between the first wood and the bark (outwardly less complete,) 3 new ligneous formations. The first is well enough developed, generally no new distinct parallel plates are to be seen, only in one case in which it was opposite to the main one.

On the circumference of each woody tubular system, occurs mucilaginous tissue which appears to consist of developing fibres generally in that round the 2nd wood, divided into wedge-shaped lines, the wedges having their narrow

end, outwards; many of these under 1-inch C. M. look like parallelog. tissue, but I think they will be fibro-vascular.

It is singular that the outer limit should be marked with an opaque punctum, which looks detached, the fibrous tissue not having reached it. The outline of the 2 wood is irregularly lobed. Compare these observations minutely with such as have reference to previous species.

Pl. CCCCLXXXVII.

1. Plant reduced nearly ½.
2. Female inflorescencé.
3. Female flower, these small ones were all abortive, but probably represent the flower as per anthesin.
4. Same, perianth outer removed, hairs should be carried to the top.

5, 5. Pistillum of the same.

6. Long section do.
7. Flower after fecundation magnified about 7 times.
8. The same outer perianth spread out.
9. Same inner do. laid open.
10. Long section of pistillum disclosing one growing and one abortive ovule.
11. The two ovula detached.
12. Growing ovula do.
13. Long section of same or as seen under graduated pressure.

Pl. CCCCLXXXVIII.

1. Fruit immature (½ nat. size.)
2. One of the carpella detached nat. size.
3. Long section, young seed removed, at *a* endocarp hardened, at *b* barren ovula.
4. Long section, seed in situ, *a* hardened part of endocarp, *b* barren ovula, *c* funicle, *d* micropyle, on the front face is represented the raphe.

5. Long section of young seed, *a* spongy flesh solid apex of teguments white towards the albumen.
6. Young album, *c* embryo.
6*b*. Embryo.

3. *Phytocrene calicarpa* Gr. *fæminea planta*, Pl. CCCCXC.

Fructus e carpidiis multis in capitato globoso sessili dispositi obovati, infra medium nudiusculi pressione angulati, supra setis subulisve his retrofactis hirta densessimis tecta.

Ima basin sepalis 4, e basi lata triangular setaceo-acuminat.

Perigoneoque membranaceo, sepalor. in modo pubescent. ad medium 4-partit. lacinis latis subcordatis.

Apex imus nudiusculum centro stylo brevis robusto exserto.

Ovar. (less developed, of the same shape, the apex nudiusculous however is longer, 3-4 gonal ending in a short thick black hirt style and 4 linear ovate recurved stigmata, these are opposed to the divisions, of the perigon.) 1-loculare, ovulis 2, 1 abortive anatropus ex apice loculi pendulis, an nuclearibus an teguments uno prædit. lacinis mucilaginif. in apicem Pistilli.

Fructus 1-locularis, Endocarpio areolato-rugosa sublente cellulosa. Mesæcarpio subosseo fibros (immatur.) vix separabilis, superfice rugosa, apex solidus lacunis mucilag. sursum ampliorib. exceptis.

Semen pendulum cavitat. implens, superfice irregulare hinc raphe conspicuscula fere $\frac{1}{2}$ complete.

Tegument. cellulosam farinaceam integram vix separabit. basin fibrosam.

Albumen carnosum copiosum, forma seminis transversely sigmoideo-carvatam, extus superfic. rugulos. papillos. intus læve nitensque.

Embryo cotyled. maximis foliaceis accumbent. sigmoideo-flexis transverse. Radicula brevissime supera hilum prope. Plumula inconspicua.

I have only seen the abortive ovula which are withered and compressed. I think there are appearances of one tegument

and a nucleus. In the fecundated ones figured, the main bulk is loosely cellular, with a tendency to breaking up in the centre. The upper half is occupied by a cellular body, which is attached inferiorly, this near the situation of the foramen, contains the embryo, the lower half is entirely cellular the upper scarcely so, I can see no defined edge to it, or other appearances to lead me to think it is a nucleus containing an embryo sac.

In the disposition of the cotyledons this approaches an Assam Menispermea.

It may not perhaps be of the same genus as the Phytocrene figured in Wall's male flower; for, in that there is a one-leaved involucre, and there appears some difference in the construction of the wood.

The longitudinal undulations of the whole seed, or its transverse sigmoid flexure is not a little remarkable, in asmuch as it exists totally independent of any inflexion of the putamen or testa.

The 4 stigmata are against its being Urticeæ and so is the general structure which approaches more to Menispermeæ.

1. Fruit-bearing stem. nat. size.
1. Fecundated pistillum, surrounded at the base by the perianth, and in this case 4 alternating bractes.
2. Long section of the same, the ovulum at first sight appears antitropous.
3. Same fecundated ovulum removed, on the posticous face of its cicatrix is a black minute body, the abortive ovulum.
4. The abortive ovulum, appearances of, raphe as well as of foramen.
5. Fecundated ovulum, *a* raphe, *b* micropyle or at any rate situation of radicle.
6. Same, long section, *a embryo-sac*, containing the young embryo in its apex.

7. Embryo sac detached, its lower ½ is cellular, this is the young albumen.
8. Embryo.
9. Immature fruit, perianth, and in this case several bractes.
10. Long section, complicated appearances, a lacunæ containing mucilage, *b* pyrena, the reniform spots are due to the section running variously through its irregular surface, *c* tegmen of seed, *d* albumen, *e* cotyledon in centre, *f f* do. at the margins, *g* radicle.

10*a*. Armature of fruit.

11, 11. Seed detached the raphe and indentation of surface shewn.

12. Transverse section of albumen, and cotyledons both sigmoidly flexed.

14. Do. of albumen cotyledons removed.

15. Embryo separated, rather oblique view.

16. Same.

4. *Phytocrena gigantea*, Pl. CCCCXC. Fig. II.

1. Perianth.
2. Involucra or calyx laid open.
3. Corrolla removed with the stamens.
4. Do. laid open.
5, 6, 7. Stamina.
8. Pollen.
9. Rudimentary ovarium.
10. Long section of do.
11. One of the hairs.
12. Transverse view of the branch cut transversely.
13. Do. section of wood.
14. Do. of the medullary rays.
15. Vessel surrounded by prosenchyma.
16. Joint detached.
17. Prosenchyma.

Natsiatum.

1. *Natsiatum*, Pl. CCCCXCVI. Fig. I.

Frutex dioicus volubilis, scandens, racemis pendulis pubescentibus, pedicellis arcuatis sursum? bracteatis, bracteis linearibus pedicellis paullo brevioribus, floribus parvis inconspicuis lutescente viridibus, pubescentibus ut etiam pedicellis.

Sepala 5 lanceolata acuta basibus connata.

Cor. urceolata 5-partita laciniis lanceolatis acutis conniventibus sepalis alternes.

Torus dilatatas. Glandulæ 5 carnosæ crescenti-formes, apicibus incrassatis capitatis petalis opposita, an e 10 perparia connat. staminibus externe sitæ.

Stam. 5 sepalis opposita, inclusa, filam. brevissima crassiuscula. Antheræ adnatæ sagittatæ oblongæ biloculares, longitudinaliter lateraliterque dehiscentes. Connectivum medium versus dorso glandulosum. Pollen ?

Rud. fæmino centrale, e pilorum massa erectorum pilis illis perianth. similibus. Æstivatio valvata.

Hab. Assam Legi Solani Mookh : *Jan.* 1836.

2. *Natsiatum gamosepalum*. Itinerary Notes p. 114, *no.* 190.

Hab. Bootan.

Stauntonia.

1. *Stauntonia trifoliata* Gr. Pl. CCCCXCV. Figs. II and III.

Frutex volubilis longe scandens, glaber. Rami novelli leviter striati.

Petioli longe, utrinque incrassati et articulati, teretiusculi supra planiusculi sæpe spithamæi.

Petioluli, inæquales laterales breviores centrali unciali, subcanaliculati. Folia 3-foliolata. Foliola inæqualia terminali majore, ovata vel ovalia, obtusa cum mucronem vel

retusa, integerrima, chartacea, supra suturati-viridia, infra glauca, basi 3 venia, marginibus subrevolutis.

V. secundariæ paucæ irregulariter nexæ, accessoriæ plures, pagina cæterum venulis reticulata. Stomata paginæ inferioris.

Flores monoici racemosi, racemis vel simplicibus aggregatis, vel basin divisis ideoque paniculatis petiolis brevioribus basi bracteis scariosis brunneis, suffulti.

Pedicelli mediocres apicem in annulum dilatati, (interdum medio, interdum subflorem bracteolata,) basi bractea lanceolata brevi suffult. in racemo articulato.

Flores nutantes utrinque sexus similes lutescentes nutantes, fæminei racemi basin versus siti, pauciores, omnes in pedicelli apicem articulati ; alabastra glaucescentia ovata.

Sepala tria ovato-oblonga carnosa submarcescentia, intus processubus irregularibus carnosis cellulosis obsita, æstivatione valvata patentia.

Processus petalorum 5-seriatim, intermediis minoribus, uti cristæ describendi, sepalorum maris obsoleti, fæminæ obsoleti, petalorum fæminæ sine ordine dispositi.

Pet. patentia angustiora æstivat. distantia subcarinataque processubus supra descriptis, totam paginam internam occupantibus an pauciores in florib. masculis.

Glandulæ 6, lanceolatæ carnosæ albæ acutæ, vasc. fasc. tenuissimo media versus evanido, filamentis basibus adjecta, biseriata, seriei ex sep. inter : petal. opposit.

Stam. 6 biseriata, seriebus ut e glandulæ alternant. Filam. leviter connata, intus convexa, extus plana, breviuscula, alba.

Antheræ biloculares extrorsæ, loculis discretis linearibus longit. dehiscent. connectivum maximum carnosum ovatum apiculatum rugosulum, ultra loculos longe product.

Pollen ovatum, 3-sulcat. glabum. Pistilla abortiva tria cava, vacua.

Fæm. tegument. maris, glandulæ totidem minores.

Stam. abortientia, formæ perfectur. sed multo minora.

Pistilla tria sepalis opposita glauca glabra angusta et irregulariter ovata, 1-locularia sutura ventralis interna. Placentæ totam faciem internam pistilli cajusque occupantes undique ovuliferi. Ovula minutissima globosa, simplice, tegumentis nullis. Interior locule cæterum nuncupata, filis cellulosis septatis hyalinis, e parte locula parietes interne suturæ ventrali exacte oppositi orientes.

Styli nulli stigmata ovato-conica viscosissima aspectu lucido

Fructus sessiles tres bini vel solitarii oblongi obtusissim· (like a short sausage) digitales, sutura ventral. latâ sed parum profunda, extus argenteo-cinerei creberrime ferrugineo lepidoti, parietibus coriaceis 1-loculares, loculo pulpa alba omnino repleto centro quasi fistuloso.

Semina 00 in pulpum nidulantum et peripheriam versus sita, hilo minuto centrifugo, ambitu cordat. sinu extrorso, majuscula, immatura tantum visa.

Testa lævis lucida, extus aspectu striato, intus viridis carnosa.

Tegument interius liberum nullum. Albumen copiosum hinc ad hilum latus excavatione minuta.

Structura ovarii, singularis, et forsan Butomeis Flacourtieisque.

Character specificus ad Stauntoniæ e Tingrei referens.

Foliis 3-foliatis, petalis intus 5-cristatis, filamentis connatis.

Tingrei.

Fol. 7-tenatis, petalis intus lævibus filament distinctis.

Male flower. **Fig. II.**

1. Male flower bud.
2. Do. sepals removed.
3. Male flower open.
4. Do. sepals removed.
5. Gland viewed as a transparent object, an incomplete vascular fascicle is seen.
6. Stamens and glands.

7. Do. (one too many!) laid open, to shew the slight cohesion of the filaments, and the 3 abortive ovaria, pistilla.
8. Pollen viewed dry.
9. Do. immersed.
10. Abortive pistill. inner or ventral face.
11. Do. laid open along the ventral inflexion.

Female flower. Fig. III.

1. Female flower.
2. Do. sepals removed. 2. Petal shewing the cellular processes.
3. Pistilla glands and abortive stamina.
4. Transverse section of ovarium.
5. Long section of a pistillum.
6. Transverse of do. shewing that the placenta occupies the whole face of the cell, that part immediately corresponding to the ventral suture producing abundance of cellular filiform articulated processes.
7. Two ovula, from the open flower.

The same.

Frutex scandens, foliis 3-foliatis, lanceolatis acuminatis terminali longius petiolutato, articulatis! Petiolo communi basi tumido. Racemis aggregatis, ramulos brevissimos, squamis scariosis tectis, terminantibus. Pedicellis filiformibus basi bracteatis, rubescentibus floribus lutescent.

Sepala 3, lanceolata acuminato-conniventia (æstivatione valvata) venosa.

Pet. 3 his alternantia duplo angustiora pauloque breviora, sepalisque intus rugosula glandulæ hypogynæ 6, oblongæ carnosæ integræ, 3 vix exteriora sepalis, 3 interiora petalis opposita.

Stam. 6 filamentis basi in columna leviter coalitis brevissimis. Anth. adnatæ, biloculares extrorsæ, 1 interdum

abortiens. Connectivum ultra antheram in processum linguiforme, subulatum product, loculis linearibus.

Pollen lanceolata, læve medio sulcatum.

Rudim. ovarii centrali, terete subulatum 3-sulcatum, processubus subulatis 3 format.

Fructus compositus e carpellis 3, an pluribus sæpe aborta solitariis ovatibus ovi magnitudine, baccatis, hinc utrinque sulcatis, sed parum profunde, 1-locularis cavitata. magna pulpa copiosa in qua semina nidulant. centraliter densiore gustu dulci et suaviuslula repleto. Semina horizontaliter sita, compressa angulata, atra hilo lineari excentrica quoad axin carpelli, parietibus nempe contiguo brunneo notat.

Testa membranaceo-coriacea nitida atra, albumen carnoso-corneum amplum. Embryo minutus in cavitata albuminus situs et hilum prope loculos, orthotropus. Radicula crassa obtusa hilum versus spectans. Cotyledones plana convexiusculæ ovatæ incumbentes quoad situm transversate seminum et diametrum transversam majorem. Plumula non examinum.

Hab. Khasyah Mountains. In sylvis Churra: *Oct.* 16*th*, 1835, and Nungklow: *Nov.* 15*th*, 1835.

2. *Stauntonia filamentosa* Gr. Pl. CCCCXCV. Fig. I.

Frutex scandens, cortice cinerea suberosa. Rami virides læves.

Folia alternantia. longe petiolata (petiolis teretibus obsoleti striatis utrinque incrassatis spithamæis,) septenatim digitata, obovato-oblonga acuminata fere caudata, integra glabra subcoriacea, supra saturati viridia, subtus albido-glauca. Venæ secondaria medium $\frac{1}{3}$ supra arcuatim nexæ arcubus venulas etiam arcuatim nexas emittentibus interstitiis omnibus reticulatis, margines subincurvi, folia axin proxima ut etiam petiolule minora, illa flores fulcientia aliquoties minora, inferiora 6-nata, intermedia 5-na, summa 4-na.

Racemi axillares paniculati in axi communi brevissimi bracteatæ inserta, basi bracteatæ, bractea ovata, viridi concaviuscula, rubri carneive. Bracteolæ florem quemque fulcientes albidæ angustæ pedicellos brevis æquantes apicibus reflexis, alabastra, quæ tantum vidi, ovato-oblonga, ascendentia, fusco-viridia.

Sepala æstivatione valvata ovato-oblonga obtusiuscula carnosa, apicibus crassis subinflexis saltem faciei interiori. Petala his alternantia lanceolato-linearia, sepalis $2\frac{1}{2}$ angustiora, paullo breviora, luteo-viridia, apicibus crassis. Gland 6 hypogynæ, late obovatæ, staminibus oppositæ, cum his separant. basibus filament. nempe adnatis, viridibus apice lutescent.

Stamina 6 hypogyna, 3 exteriora sepalis opposita, 3 interiora petalis opposita.

Filamenta ima basin leviter coalita, brevia sub 3-gona, angulo 3-tio interiore crassa. Connectivum crassum carnosum apice subulato ultra antheras breviter producto. Anth. adnatæ extrorsæ vel anticæ biloculares longitudinaliter dehiscentes, loculi angusti lineares.

Pollen album, læve ovato-lanceolat. hinc sulcat. Rudimenta fæmineorum 3 centralia teretia, apicibus obtuse conica, ibidemque lucida secus faciem internam sulcatæ, vero convoluta sunt.

Hab. Assam. In sylvam cum Theâ consociata occurrit Tingrei: *Feb.* 23*rd*, 1836.

The rudiments are convolute, they have one vascular fascicle (spiral vessels and ducts,) which towards their apices are much increased in number.

The third sepal is posticous or next the axis.

The glands are probably representatives of petals, the inner series of which are therefore transformed, the alternation of parts is throughout natural.

NYCTAGIACEÆ.

Boerhavia.

Boerhavia repanda. Ræm. et Schultes.

Decumbens, caulis teres, striatus, strigosus.

Folia petiolata, cordato-ovata, sinuato-repanda, pilosa præsertim ad venas, margine discolor.

Flores umbellati, plerumque 5-6, pedunculo communi axillari, folium longe superans.

Invol. polyphyllum, foliolis linearibus, ciliatis.

Perianthium rosaceum progenere magnum.

Anth. didymæ 3, vel 4. Filam. capillaria, cum stylo exserto. Stigma capitatum.

Hab. Madras. In Fruticetis prope vellore: *Aug.* 21*st*, 1833.

POLYGONACEÆ.

Polygonum.

Polygoni sp.

Herbacea erecta ramosa, pubescens, caules teretes glabri (juniores pubescentes) ochreis fere omnino occultatis.

Fol. lanceol. utrinque sed præsertim ad apicem acuminata, integra repanda pilosa, ochreæ pubescentes ciliatæ truncatæ petiolum longe excedentes.

Flores paniculato-racemosi plures ex axilles bractearum ciliatarum. Pedicelli graciles bracteis longiores. Flores albi subcernii, polygami.

Per. 5-fid. laciniis æqualib.

Stam. 6, 4-sepalis opposita, alterna, 2 iis opposita. Filam. filiform. Anth. bilocul. longitud. dehiscentes.

Stylus 2 fid. stigmata 2 capitat. Pericarp. perianthio obtect. ovatum, nitide nigrum, stylo durefacto terminatum.

Epicarp. et mesocarp. fere osseum. Endocarp. cellulosum, argenteo nitidum, albumen centrale farinaceum. Embryo peripher. Rud. supera.

Hab. In aquosis, Moulmein: *Dec.* 1833.

CHENOPODIAÇEÆ.

Chenopodium.

Chenopodium ilecifolium Gr. Pl. DXXIV. Itinerary Notes, p. 216, *no.* 86*a*.

1. Alabastrum.
2. Flos ad anthesin.
4. Stamen interne.
5. Stamen externe.
6. Do. lateraliter.
7. Pollen.
8. P. immersum.
9. Ovarium cui *fortæ* cellulæ superficiei quædam adhærent.
10. Eujusdem sectio longitud.
11. Ovulum.
12. Fructus.
13. Idem calyce aperto.
14. Utriculus.
15. Idem verticaliter pericarpio separato.
16. Utriculi sectio longitud.
17. Seminis sectio longitud. exhibens, tegmina bina, albumen centrale et embryonem peripheric um.
18. Embryo.

Hab. Affghanistan Shaikarpore.

Beta.

Betæ sp. Pl. DXXV. Itinerary Notes, p. 216, *no.* 85.

Affinitas certe cum Urticeis, for it agrees in habit, in separation of the sexes, in the male perianth, in the anthers and their relation to the leaves of the perianth, in the aggregation and subcohesion of the female flowers: in the structure of their perianth and its relation to the ovary, in the structure of this, as well as in the structure of and non-correspondence in the number of stigmata, and in the ovulum.

The want of vascularity of the ovarium, and consequently of the stigmata is very remarkable. The want of bracteæ to the flowers of female sex, is also worthy of notice. Although the stamina have no vessels, and although the female flowers may be axillary, still the male flowes are most developed; a fact worthy of much notice.

The male inflorescence is inverse; the female is simply axillary.

The curious cells of the superficies must not be passed over.

If Beta had stipules why should it not be Urticeous?

1. Alabastrum. 1*a*. ejus æstivation.
2. Flos.
3. Filam apertus, antheræ primo corrugatæ, demum deciduæ.
4. Anthera dorso.
5. Pollen.
6. Pollen immersum $\frac{1}{2}$ v.
7. Acervulus florum fæmin.
8. Flos segregatus.
9. Flos apertus longitudinal.
10. Ovarium.
11. Ejusdem sectio longitud.
12. Ovulum.
13. Ejusdem sectio longitudinal.
14. Cellula pedicellata superficiei.

Salsola.

Salsola Pl. DXXIII. Fig. II.
Hab. Affganisthan.

AMARANTACEÆ.

Gomphorena.

Gomphorena globosa.

Flores capitata unusquisque bibracteatus, bracteæ membranaceæ, coloratæ, lanceolatæ, carina dorsali dentata.

Cal. 5-sep: sepalis linearibus. coloratis nervo medio viridi extus pilis gossypinis non articulatis stipatis.

Filam. hypogyna in tubum membranaceum apicem 5-dentatum (dentis quaque bifid.) sepalorum longitudinis, ideoque germini longiorem concreta.

Anth. dorso insertæ, lineares. 1-loculares, longitudinaliter dehiscentes. Pollen areolis cellulosis notatum.

Ovarium globosum membranaceum 1-loculare, 1-ovulatum. ovulo pendulo stylus 1-filiformis, stigmata 2 papillosa. Pericarpium (utriculus) membranaceum. Cal. obtectum.

Embryo curvatus, peripheericus, albumine farinacea centrali, radicula hilum spectante, plumula inconspicua. Pili calycinis exceptis, articulata, articulis paullum tumidis.

Demoschæta.

Desmochæta lappacea.

Achyranthes lappacea. Roxb. Fl. Ins. 2, 500.

Herba decumbens, pubescens, fol. oppositis rhomboideo-obovatis breve petiolatis, spicis terminalibus, floribus pubescentib. canis viridibus post anthesin deflexis.

Flores binati seu ternati, hoc casu medius nudus lateralis 3-bracteata, axillis. Bractearum lateralium setarum uncinatarum faciculum gerentibus.

Per. fere 5-sepalum, sepalis subæqualibus demum conniventibus.

Stam. 5-sepalis opposita filamentis basi in cyathum ovario breveorem coalitis, dentibus brevibus obtusis interjectis. Anth. 2-loculi. Stylus filiformis 1, stigma papilloso-capitatum.

Utriculus membranaceis monospermus. Stigmata persistente coronata periantheo conniventi inclusus fasciculis 2 magnis setarum colorat. uncinatarum in axillis bractearum lateralium persistent. stipatus. Semen ellipsoideum hinc ad hilum emarginatum. Cotyledones incumbent. ?

Hab. Bengal Jumalpore: *Sept.* 20*th*, 1835.

Genus Digeræ propinqueum, ovarium apicem versus pilosum vel glabrum.

The fascicles of setæ are abortive flowers, when they are 3 flowers together the lateral bractea of the intermediate one, become the anticous ones of the 2 lateral flowers; when only 2 flowers are developed, the senior flower has only one lateral bracte.

Achyranthes.

1. ***Achyranthes aspera.***

Annua 3-4 pedalis pubescens articulis tumidis, fol. oppositis breviter petiolatis obovatis subrepandis in petiolis attenuatis, tactu mollibus spicis terminalibus multifloris villosis, floribus inconspicuis, herbaceis bracteis nitidis rosaceis fructibus nutantibus axique adpressis.

Pet. basi 3-bractiat. Bracteis membranaceis ovatis inæqualibus, 1 majore antico nervo medio dorsali nec prominulo, 2 posticis minoribus, nervis dorsal. mediis prominulis, in omnibus et præsertim in his ultra limbum in spinas subulatis rosaceas productis.

Sepala 5, quorum 2 posticumque exteriora paulo majora, viridia, marginibus membranaceis acutis.

Stam. 5 hypogyna basin versus in capula coalitis. Filam.

subulata, apices versus rubescentia, squamis oblongis cellulosis apicibus fimbriatis interjectis. Anth. oblongæ medio affixæ bilocul. long. lateraliterque dehiscent. Stylus filiformis stam. brevior. Stigma subcapitat. Ovarium turbinatum 1-loculare, ovula 1, pendulo ab apice funiculi longi.

Hab. In muris. Moulmein : *Nov.* 1834.

2. *Achyranthes aquatica.* Roxb. Fl. Ind. 2, 497,

Suffruticosa erecta 3-pedalis, caule ramisque obtuse 4-gonis pubescentibus, fol. breve petiolata lanceolato-acuminata cum-mucrone repanda utrinque pubescentia. Spicæ subcylindricæ breves 1-2 uncialis, terminalis, villosæ lanatæ. Bracteæ 2 postica spinescentis, antica inermis longe acuminata, sepalis lineari-lanceolatis spinoso-acutis. Filam. sterilia vel dentis cupuli cum staminibus alternantis, lamina exterior 3-dentata interiora trun cata, utrinque ciliata. Stigma capitat.

Hab. Bengal Mymunsing. In umbrosis humidis secus ripas fluv. Dhumar : *Oct.* 1835.

Centrostachi aquaticæ quam proxima habitu ut vera Achyranthidis spicies, axin caulis prope vasorem fascicula 2 subdistantis adsunt, fasciculi cujusque internodii decussunt.

Ob. bracteas spinescentes forsan vera A. aquatica Roxburgh ideoque C. aquatica Wall, diversa.

Philoxerus.

Philoxerus ferrugineus.

Achyranthes ferruginea. Roxb. Fl. Ind. 2, 502.

Annuas decumbens prostratusve, caulibus ramosis 4-gonis, fol. oppositis obovatis vel rotundato-obovatis acutiusculis spicis axillaribus terminalibusque abbreviatis subconicis floribus (dull red.)

Flores 3-bracteati, bracteis membranaceis antico inferiorive, post lapsum fructus tantum persistente. Cal. Per. subæquali profunde 5-partitum, laciniis lanceolatis coloratis subcoriaceis

3-nervis, nervis prominulis. Filam basi in cupulum intermedia edentulam ovario multo breviorem coalita, sepalis opposita. Anth. biloculares. Stylus breves. Stigma capitatum edentulum papillosum utriculus periantheo immulato colorato persistente connivent. obtectum, idem cum bracteis lateralibus membranaceis apice cellulosus nec circumsciss. e valvis. Semen orbiculare compressum (lenticulare) aterrimum nitidum.

Hab. Bengal. In arenosis inundatis Jumalpore: *Sept.* 20*th*, 1835.

Alternanthera.

Alternanthera sessilis.

Perianth basi 3-bracteatum, 5-sepalum, sepalis æqualibus ovato-lanceolatis, acutis, denticulatis vel subintegris, 1-nervus, 3 exterioribus, 2 interioribus lateralibusque quinto postico.

Urceolus staminifer. ovario brevior subdecem dentatum, dentibus alternis et sepalis exterioribus oppositis semper antheriferis alternis varie dentatis (antico sæpius simplici) brevioribus.

Filamenta antheriformia subulata.

Antheræ uniloculares ovatæ longitudinaliter dehiscentes, dorso medio affixæ. Pollen læve. Urceola dentes fasciculis vasorum omnino orbatæ.

Ovarium compresso-orbiculatum verticaliter compressum ideoque lentiforme, ratione axis spicæ transverse, 1-loculare. Ovulum unicum campanulitropum funicule basilaris longiusculi ope sustentum. Foramen hilo approximatum.

Stylus brevis subcylindricus. Stigma papilloso-capitatum.

Capsula (utriculus) obreniformis, membranaceo-cellulosus, subulatus marginibus incrassatis, basi bracteis sepalisque immulatis stipata evalvis (Br.) 1-locularis.

Semen subcompresso, orbiculatum funiculo filiformi longo sustentum, brunnescens.

Tegumenta bina? utrinque membranaceum, interius? tenuissime micropyle hilo approximatum obsphacelatione conspicua, albumen laterali farinaceum. Embryo arcuatus periphericus. Radicula teres obtusiuscula hilum spectans. Cotyledones lineari-lanceolatæ acutæ. Plumula inconspicua.

Herba inconspicua decumbens in aquaticis proveniens. Folia opposita obovata in petiolum attenuata. Petiolis basin connatis, ciliæ inter et intra-petiolares. Flores inconspicui minuti in spicam conoideam capituliformem dense aggregati. Spicæ axillares sessiles sæpius solitariæ, earum axes cellulo-pilosæ, antheræ rarissime 4.

Hab. Bengal. Legi secus ripas flum. Jellinghey: *Sept. 5th*, 1835.

Digera.

Digera arvensis, Pl. DXXVII. Fig. II.

Perianth 3-bracteat. bracteæ 2 laterales cum fructu deciduæ, in axillis appendiculata, 1 antica, sepalum anticum suffultiens persistens in appendiculatum, appendiculæ stipitatæ, stipiti nervo medio bracteæ adnatæ, lunatato-bilobæ, demum post anthesin ramosæ cornubus similes fiunt. Perianth biseriatum, seriei externa e sepalis 2, calycinis majoribus, concavis, anticum et posticum, interna e sepalis petaloideis subconniventibus planis, obtusis, 2 majorib. 1 majora.

Stam. 5-sepalis opposita. Filam. ima basi in cupulam brevem coalita filiformia. Anth. didymæ, connectivum parvum, apice glanduliform. Pollen globosum, læve.

Ovarium 1-locul. 1-ovulat. *ovulo pendulo* foramen versus hilum. Stylus filiformis, stigma bifidum.

Utriculus verrucosus, ad apicem cornua 2 brevia gerens, parietibus crassis. Testa membranacea, albumen farinaceum. Embryo curvatus periphericus. Plumula inconspicua. Cotyledones oblongo lanceolatæ.

Herba decumbens, ramosa. Caulis flexusa, subteretes,

striato-strigosa. Folia alterna, ovato-lanceolata, obtusa, petiolata subtus ad venas pilosa, repanda, margine discolori. Petiolis 1-uncialis superne canaliculatis ciliatis, axillæ *omnium* gemmiferæ. Inflorescentia spicata, axillaris. Flores solitarii alterni subdistantes, virido-purpurei, spicæ 3 pollicares basin versus nudæ, sepala calycina 6-7 venia, petatoidea 1-venia, æstivatio imbricato, sepala calycina reliqua obtegentia.

Hab. In arvis cultis Vellore, rare.

Perianth. post anthesin connivens. Sepalis calycinis reliqua obtegent.

Antheræ medio dorsi affixæ, biloculares longitud. et introrsum dehiscentes. Pollen album.

Ovar. apicem depressum quasi truncat. ovulum pendulum ab apice funiculi basilaris, utricali cornuum sinus styli basin gerit. Bengal Jellinghey: *Sept. 6th*, 1835.

ARISTOLOCHIACEÆ.

Asiphonia.

Asiphonia piperiformis, Gr. Pl. DXXVIII. Fig. I.

Frutex subscandens. Caule ramisque articulatis ad articulos incrassatis. Fol. alterna vel distincti subpatentia vel subpendula, breve petiolata, e basi ovato vel subcordato ovato-acuminatissime caudata integra subtus pubescentia, basi 5-venia, venis 2 lateralibus evanidis cum lateral. exterior intermediate primar. cito confluentibus, hæ intermedium apicem versus cum 2 secondariis costæ arcuat. interveniis cæterum transverse venulosis interstitiis reticulatis.

Inflorescente cymoso corymbosa terminalis et axillam folii penultim.

Fl. sursum subsecundi erecti, inconspicui inertio virides-centes demum purpurascent. bracteis linearibus setaceo 2 lateralibus centro 0!

Ovar. breviter pedicellat, rotundat. 4 gonum dense pubescens.

Per. carnosum rotatum, sepalis 3, cordatis extus pubescent intus reticulatis, in alabast. depresso ambitu obsolete 3-gono.

Stam. 1-seriata, 8-10. Filam. 0. Antheræ connectivo carnosæ glandulosæ pubesc., extus curvata marginibus curvatis adnatis, biloc. locul. distant. longit. dehiscent. Pollen granulosum, grannula in aqua deciduis.

Stigma centrum genital. disci implens lobato-sinuosum.

Stylus 0. Ov. 4-loculare, loculis minutis angulis respondent. Placentæ cruciatum centro cohærent. Ovula in cuique loculo 00, biseriata serie una e quaque marginam inflexaam, anatropa minuta.

Fructus siliquiformis, immatur tantum visi.

Caulis 4-sulcato canalicul. e medulla centrale rotundato magnum corticeque tenui. Lign. exconcentric. radiis medullariis conspicuis, densiusculi vasis majusculis sine ordine sparsis, composit. e fibris tenuibus vasisque *cellularly* punctuatis.

Ligin. Menisper. Piperac.

Odor. Piperaceus, caulisque foliaque.

Perianth Anonacearum.

Fibres not unfrequently punctuate, bases with coniferous markings, often obscured by the enlargement of the central disc as in most woods.

Hab. Malacca ad marginum viæ sylvaticæ inter Ayer Punnus, et ——½ way.

Sp. Char. Per. rotatum, 3-sepalum, (tubo nullo) stam. uniseriatæ.

Ovar. 4-loculare, stylus 0. Stigma discoidea sinuoso-lobat.

Fructus siliquiformis.

Frutex subscandens facie Piperis.

Rachibus inflorescent. subincrassatis.

The bractes can scarcely be considered as belonging to the flowers, as the insertion is always a little above, and

often a good way, this however may depend upon partial elongation of the rachis.

Under each branch of inflorescence is a conform. but larger bract.

Asiphonia Pl. DXXVIII. Fig. II.

Fructus siliquosus, subtorulosus stipitatus, 4-valvis.
Replis non interjectis.

Placenta libera centrali, 4 gona, valvis dorso striato-costat. seeds in single series along the flat faces of the placenta, which are opposite the valves, sub 3-angular placed end to end in a moniliform manner externally rugose greyish.

I have only seen abortive ones.

The characters of the fruit approach closely to those of Ascoma, perhaps the only difference is the want of the alternating reploid lines.

THOTTEA.

Thottea grandiflora Pls. DXXX. and DXXXI.

Frutex 3 pedalis, robustiusculus, apice parce ramosus. Ramulis pubescentibus. Folia alterne exstipulata sub disticha subsecunda oblonga vel obovato-oblonga superiora (ramulor.) majora coriacea cuspida brevi lataque, breve petiolata subtus dense pubescente hirta venulis ultimis etiam subtus elevatis.

Racemis ex axillis folior. lapsor. caul. pubescenti hirtis, 2-3 unciaii nutantibus, bracteis distichis lineari-oblongis subcarinatis.

Flores amplissime penduli longitudine fere 5-unciale latitudine extreme 4-4½ unciale, colori luridi purpurei, interveniis irregulariter albo-maculata (dashed.)

Perianth. campanulat. membranem petaloid. æstivat. valvat. apicibus subinflexis, venis primariis conspicuosis tactu scabris, basilaribus intermediis incompletis varie nexis, margine re-

volutis intus filamentis floccis confervoid vel fungiform, lilacinis dense vestitum.

Fundum corollæ nidificatur, columna brevis purpureo-sanguinea.

The perianth is fleshy at the base and throughout, tears readily, its inner surface is irregularly undulated and has altogether a mealy appearance.

Stam. biseriata seriebus subopposititis, filam. brevia carnosa.

Antheræ adnatæ, loculis 2, angustis. Pollen concavo-convexum punctulat. in aqua, subsphæric. superfice granulosa. stigmata 13 radiantia quasi insuper serien summam stamen superumpositim, radiis convexiusculum, radiis fund. 4, in centro in crucis formam, meeting, 4 alia interjecta as the 4 primary ones diverge, a very curious conformation.

Superficies radii supera aspectu glutinoso.

Stigma fungiform.

Ovarium tortum spiral. oblongum, pube brunneo-hirtum-omnino inferum 4-loculare.

Fructus siliquiformis siliquam Hyperantheræ simulaus, 4 uncialis utrinque subattenuatis, breviter pedicellatis subtortis angulis 4, prominulis, rotundatis, asperis, pube brunneis, subtorulosis, valvis *carinatis* 4-valvis, completa, *placentis* liberis factis in form. filament. Placenta libera carnosa, 4-angularis.

Semina pauca oblongo-ovata, in concavit. placent. lateral. quasi nidulant. et cellulosa, tela ejus vestita, ideoque aspectus cellulosus punctis nudis? brunnescent. paucis exceptis pendulis, angulis affixa, huic convexa hinc convex trigona.

Tegum. exterius spongioso-cellulosum, superfice irregularia.

Tegum. internum indurat. subosseum brunneum superficien undulat. intus nitidum.

Albumen copios. carnosum, cavitat. tegm. inter. conforme.

Embryo minimus hilum prope in cavitat. albumen. ovatus dicotyledon, materia gelatinosa circa an sacculis embryonar. reliquis, orthotrop.

Tegum. terti. memb. cellulos. tenuis ultra album apicem in apicul. product.

Ovarium angulis 4 rotundato dense pilosum, loculis totidem sectione transverse 3-angularib. angustis, placentis cruciata crassa, angulis alterna, ramis quoque extus 1-vascular. Ovula pauca minuta pendula oblonga, prope hilum. tegumenta bina, interius abbreviata, ore simpliciora solito, exterius vescculos. sed verisim. ex *abortionem*.

Aromata, habitu, partu numero ternario, albumine subruminato embryoneque Anonaceis affinis.

Generic diagnosis, consists in the campanulate perianth number and double series of stam. and the stigmatic lobes having no relation to the ovarial cells, et infinis ovario 4-loculare ! upper stamens sub 16, under ditto sub 18.

ARISTOLOCHIEÆ.

Aristolochieæ sp. Pl. DXXIX.

Itinerary Notes, p. 7. *no.* 94.
HAB. Bengal.

NEPENTHACEÆ.

NEPENTHES.

1. *Nepenthes sanguinea* Gr.

Scandens sæpius epiphytica, caulibus (an semper) abbreviatis. Foliis arcte imbricatis sessilibus, once or twice undulate, e basi cordato semi-amplexicaul. oblongo-obovata vel cuneata, univenia, coriacea glabra, venæ prolongationem except. quæ ferruginea, dense tomentos. leaves varius sometimes spathulate.

Pedicellus ampullæ spithamæus, uti vena pubescens brunneo-coccinia, apicem versus obtuse 4-gona rectus.

Ampulla rigida erecta, obovato-oblonga, amplissime pedalis fere, diametro 3½ unciali, venis longitudin. *endoginosis* dorsali apice excepto 0, cristis 2 ventralibus fimbriatis.

Os antice parum producte, angustum postice latius et productum into a fold bearing the lamina, rugis most delicate, lamina subcordate ampla plana, intus glandulosa, longitud. venosa, vena dorsalis basin laminæ prope, in processum rectiuscule, tridentiform product : process sometimes simple. Color. ampullæ extus luride-sanguin. oris vivide (arterial.) vena dorsalis atro-sanguin. (pubesc.) lamina supra ejusdem coloris, intus venous red mottled with dusky.

Hab. Malacca at Goonong Ledang : Summit and towards summit.

Sp. Char. fol. caul. florĩger rather crowded, basi cordate ½ amplexicaul. breviuscul. caulibus 3-gonis obdecurrent costæ et marginem.

Panicul. longiuscul. pedunculat. glabra, oppositifol. a media supra floriger, flores minute ferrugin. pubescent sepalis intus nigrescentib. pedunculis bi-tri-floris superior unifloris.

2. *Nepenthes pumila* Gr.

Pumila partib. novellis ferrugineo-pilosa, fol. amplixicauli-spathulata subtus costa prominule et ferrugineo-pilosa, cirrhus costæ apicem *dilatat. apertus*. Ascid. oblonga, cirrho 1½ uncial. supra medium slightly constricted.

Cristis posticis 2, magnis fimbriatis dorsali 0.

Os oblique *postice* simplex, *antice* parum product. planum-rugis inconspicuis.

Lamina cordato-oblonga ample processus obsoletus.

Hab. Malacca at Paddam Bhattoo.

Obs. It may be a young form, but I scarcely think so. It should be allied to the blood-red pitchered species.

3. *Nepenthes* sp.

Caulescent. scandens, caulibus subtrigonis, fol. oblongo-lanceolatis angustis, cauli altiuscul. adhærent : vena central. conspic : lateral. endogenosis indistinctis.

Pedicello ampulla pedale tortila volubilis ampullum prope fauce postica plana, antica convexa. Ampullis sublageniformi-oblongis, parvis e basin ampliuscule sub-attenuatis, cristis 2 ventralibus parum coalitus simplicibus, vena dorsali apicem versus distinctior infra apicem processugeris.

The two crests are often produced at the apex into a filament.

Os antice simple, postice product. supporting the lid *but here plane,* lamina cordato-reniformi, plane with two lateral bundles of subendogenous veins, and indistinct central ones.

Color viridescens lamina mottled with bloody.

Hab. Malacca at Ayer Punus in Marshes common.

4. *Nepenthes* sp.

Caule scandente superfic. floccoso pruinoso.

Folia longe petiolata petiolis etiam floccosis, basi dilatatis conduplicato-canaliculatis.

Lamina petiol. lineari elliptica, utrinque breviter attenuato 3-venia, venis lateral. obsoletis marginem revolutiusculo, interveniis subtus floccolosis.

Pedicellus ampullæ sub pedalis, sursum incrassatus tortilis.

Ampulla magna perpulchre clavata vel oblongo-obconica e pedicello gradatim evoluto.

Carina una dorsali 2-ventialis omnes simplicis indivisæ ventralibus paullo infra oris marginem, ramulo transverso. connex.

Os quasi bilabiatis rugis magnopere evolutis antica posticeque produced into an eminence, the posticous one bearing the lid.

Lamina oblonga ampla, interne subavenia, superne bivenea,

venulis ad insertionem laminæ confluent. et unicum recurvam productis.

Color ampullæ luteo-albid. maculis brevidis rubro-sanguineis-rugis oris vel luteolis vel atro-sanguineis.

Hab. Malacca at Goonom Ledang Puddam Bhattoo.

5 *Nepenthes* sp.

Caulibus fructigeris ex ascidiis scandentibus glanduloso pubescent, pube parte novell viride ferrugin.

Fol. distant. petiolo breve basi dilatato, lamina elongato-lanceolata, infra in petiol. attenuata producta (ideoque fol. sessilia) coriacea integerri.. subtus pubesc. supra 1-venia, subtus costa prominula, venulis 2 endogenosis, margine versus indistinctis, costa apice product. in cirrhus dense pubesc. apicem coniform.

Panicula terminatis ferruginea, sepalis foliaceis reflexo-patentis, fructibus oblongo-clavatis apicem quasi truncatis, rotundatis 3-4 gonis. Pedicellis fl. infra 2-3 floris, sursum 1-floris.

Caulibus ascidigeris terrestribus abbreviatis, foliis confertis, sessilibus ½ amplexicaul. petiol. ascid. ferrug. pubesc. brevissim biuncialis.

Ascid. subovuta ovi gallini magnitud. in terr. recumbent. ore constrictiuscum venulosa, more endog. *dorsali* 0.

Cristis 2 *posticis* maximis pulchre fimbriatis, os simplex, margin very *deep and nearly perpendicular*, utrinque simplex, rugis well developed.

Lamina angustissime spathulata sessilis recumbent. in ascid. ad basin anticum processugerum.

Color. oris viridescens, ampullæ et laminæ, viridescent maculis sanguineis.

Hab. Malacca Paddam Bhatoo, montis Toondook.

Paniculis fl. mascul. racemiform subcylindraceis, oppositifoliis (vero terminal) axilla fol. superum gemma parent.

6. *Nepenthes* sp.

Caulibus longissimis scandentibus ramosis, ramis crowded with ascidia, supra foliosa, fol. distant. cortice vetustior suberosa.

Fol. ramor. ascidig. conferte imbricat. sessilia e basin cordata ½ amplexicaul, alter. in cirrhum brevem robustum 1½ unciali.

Ascidia creberrim. erecta subovata compressiuscula venulosa (endogen.) cristis 2 posticis maximis bifimbriatis, lamina spathulata, dimid. longitud. ascid. subavenium supra, subtus bivena obsolete et basin prope processus 3 sessiles gerens.

Os ad insert. laminæ quasi *emarginato* fere horizontal.

Margo profundus obliquis, os constringens.

Hab. Malacca Ayer Punnus.

Allied to the *Puddam Bhatoo* species.

Nepenthes from Botanic Gardens, Pl. DXXXII.

Chiefly worthy of notice on account of the difference of development between the ovula of the upper, and those of the lower portion of the panicle.

Thus 5, 6, 7 represent anatropous ovula with two distinct teguments, from lower part fig. 8, from upper, part antitropous ovula with one coat.

This is very curious, there are some reasons for believing, that the coat of the antitropous ovula is the inner membrane, the outer being abortive, because it resembles considerably the inner coats of the anatropous ovula, and because the long funicle is evascular, while in the others there is a raphe.

The mode of attachment of both requires to be examined, as well as the ovula towards the middle of each inflorescence.

The carpella alternate with the sepals.

1. Female flower.
2. Stigma of do.
3. Ovary transverse section of.

4. Portion of a carpellum and one of its placentæ, from an ovary of the lower part of the panicle.
5. Ovula from do.
6. Ovulum do. testa open longitudinally.
7. Ovulum. Testa and tegmen opened.
8. Ovula from upper part of spike, the process at the foot of the long funicle requires examination, nucleus adherent to tegument.

CASSYATHACEÆ.

Cassytha.

Cassytha filiformis,

Herba in fruticibus parasatica aphylla eisque spongiolis concavis ad nexa. Caules volubiles, glabri striati. Flores spicati parvi albi virescentes. Spicæ paucifloræ, basi 3-bracteata.

Perianthium basi squamatum tubo brevi, limbo profunde 3-partito, sepalis ovatis erectis. Bracteolæ 3, nanæ, tubo affixæ, sepalis alternantes. Æstivatio valvata.

Stamina triplico ordine disposita, nempe 3-6-3, exteriora petaloidea, introrsum bracteolis opposita. Intermedia 6, quorum, 3 basi 2-glandulosa extrorsa seriei externa opposita, 3 basi nuda, introrsa, ordini tertio opposita. Filam. horum 6 clavata, brevissima ordo tertius sterilis, e glandulis oblongis formatus. Ovarium 1-loculare, 1-ovulatum, ovulo pendulo, stylus brevis subulatus, stigma obtusum.

Pericarpium calyce ampliato baccato apice pervio tegmentorum exuviis coronata obtectum, 1-spermum. Semen pendulum. Testa membranacea tenuissima. Cotyledones, crassi plano-convexi. Radicula supera, brevis. Plumula conspicua, 2-phylla, foliolis plano-convexis.

Mr. Brown describes the exterior anther as introrse, the interior extrorse. Nees Von Esenbeck, the 3 interior as ex-

trorse, I find them alternately introrse and extrorse, thus the outer petaloid series, is introrse; those with 2 glands at the base are extrorse, the 3 remaining are again introrse.

The outer series of the perianth I call bracteolæ, as they resemble entirely those at the base of the calyx and of the spike.

LAURACEÆ.

CINNAMOMUM.

Cinnamomi sp.

Arbor vel arbuscula, ramulis petiolis foliisque utrinque breviter et pallida ferrugineo-tomentosis, fol. alternis ovatis vel lanceolatis, obtuse acuminatisque subtus glaucis supra basin 3-nervus, marginibus cartilagineis. Paniculis axillaribus terminalibus breviter punctat. foliis longioribus. Bracteis caducis, floribus extus brevissime tomentosis (velutinis?) pallidissim. viride lutescent.

Inflorescentia nuda. Per. connivens brevissime tomentos. Stamina 3 interiores series, latere dehiscent. glandulæ maximæ; stam. sterilib. alternant. sagittatis, lobulo minimo interjecto. Stigma capitat.

Odor. florum ingratis amylaceus, vix aromatica.

HAB. In sylvis. Mergue. *Nov.* 1834.

Cinnamomum N. ab. E. in cujus dissertatione de Laurineæ Indiæ orientalis analysis ultra limitis naturæ ducentur.

PERSEA.

Perseæ sp.

Abor. humilis, fol. lanceolato-elliptica coriaceis intigris obtusis marginib. cartilagineis subtus glaucis inflorescent. nuda paniculata paniculis terminal. et axillis folior. superior. cymosis, floribus minutis viridi-lutescent.

Per. biseriat. subæquali 6 partit. serie externe paulo minore (æstivatione valvatum) extus intusque pubescente sericeum.

Stam. perigyna 3 serialia, seriei externe sepalor. exterior intermedia, sepalis interior. interne exterior opposit. seriebus binis exterior. basi nudis, interne basin bistaminosa. Stam. 4, ordinis antheriformia, sepal. interior opposita. Anth. 4-locellatæ.

The same

Arbuscula, ramulis, apicibus foliosis, foliis alternis, ramis subopppositis, petiolatis lanceolatis vel obovato-lanceolatis obtuse acuminatis integris subcoriaceis, marginibus subcartilagineis infra glaucis, cymis terminalibus paniculatis unico dichotomis floribus minutis citrinis pedicellis basi bracteolatis.

Cal. 6-sepalus, sepalis æstivat. imbricatis (majoribus interior ovatis velutinis. Pet. 0.

Stam. 6, perigyna, biserialia, seriei externa introrsa sepalis opposita, tardius dehiscentia, seriei interna inaquali 3 longior. fertilibus, basi 2 glandulosis, sepalis exterioribus minoribus opposita, 3 brevior sterilibus, sagittatis antheris subconniventibus 3 majoribus oppositis extrorsis, valvis extrorsum versus, paulo longiora, filamentis serieis interior, exterioris glabris pilosis, anth. quadralocular, loculis infer primo dehiscent. Stam. fauci calycis inserta, Ovarium superum, rotundat. Stylus subulatus, stam. 3 fertilia seriei interior æquans. Stigma subcapitat. papillosum, 6-loculare 1-ovulat. ovulo pendulo ab apice loculi.

Hab. Mergue. In sylvis. Ins. Madamaca: *Oct.* 1834.

Persea Sprengel nec. N. ab. E.

Tetranthera.

Tetrantheræ sp. Pl. DXXXIII.
Itinerary Notes, p. 144, *no.* 692.

CORYZADENIA. *Incertæ sedis Laurineæ affinis.*

Coryzadenia trifoliata Fruticosa longe scandens caulibus teretibus.

Foliis alternis distantibus longe petiolatis palmatim 3-foliolatis petiolulis uncialibus, oblongo-ovatis brevissima cuspidatis repandis peninervus basi cordatis, 3-nervius marginib. diaphanis subtus ad nervos pubescent. supra sublente punctulat. contusis aromaticis.

Paniculis cymosis axillaribus folia pendulis foliis brevioribus vel æquantibus, bracteolis minutiss. ad basin cujusque floris, floribus majusculis purpurasus petalis albis.

Cal. superus tubo nempe fusiforme brevi ovario adnato velutino limbo 5-partito laciniis-lineari lanceolatis acutis petaloideis, reflexis æstivatione valvatis.

Pet. totidem conformia albida reflexa, sinubus basi 1-glandulosis, glandula cuneata emarginata calycinis inserta. Squamulæ 10 unguiculatæ, cucullatæ deorsum curvatæ, 2 cuique utrinque cujusque filamentim ideoque sepalis oppositis.

Stam. 5 libera, sepalis opposita fauce calycis constricta inserti, filam. extrorsum curvato glanduloso pubescens filiformia.

Anth. bilocul. connectivo majusculo viridescent. bilocular. valvatim dehiscent. valva *revoluta.* Pollen globosum oblongum hispidum, stylus filiformis staminib. brevior. apicem complanatum sinuatumque, stigma lineares sinuosas styli sequens. Ovarium calyce tubo adnatum in pedicello breviss. articulat. 1-loculare, 1-ovulatum, ovulo pendulo ab apicem loculum foramen hilum prope.

HAB. Mergue. In sylvis. Ins. Madamaca: *Oct.* 1834.

Habitu passiflorear. cum ordine etiam aspectus floris propinquans.

Pet æstivatio valvata, valva locularum extrorsum revoluta. Berberideis laurineisque ob antherum dehiscentiam affinis et his ob aromata.

PROTEACEÆ.

Helicia.

Heliciæ sp.

Arborea 3 pedalis, ramis cinereis, trunco albido, demissius ramoso, ramulis angulatis, petiolis foliisque junior. pedunculis calycibusque ferrugineo-pubescent. fol. sparse obovata in petiola attenuata obtuse acuminata, repanda, coriacea, senior glabra.

Subintegra vel apices versus distanter serrata marginib. cartilagineis.

Racemis erectis axillaribus terminalibusque solitariis vel binis, folia longiorib. pedicellis 2-floris, floribus numerosis lutescent ingrate odoratis.

Bractea pedunculi commune paullo excedent. pedicellis bases vessus bracteolat.

Per. ante anthesin tubulosum, demum 4-sepalum, sepalis arcte revolutis linearib. angustissimis æstivatione valvatis.

Stam. totidem sepalis opposita, iis per tota fere longitudine adnatis, cum que iis reflexis, filam. libera fact. brevissim. apices versus pubescent.

Anth. lineares, apiculatæ, apiculo glanduloso lutescent. bilocular longit. dehiscentes extrorsæ.

Glandulæ hypogynæ 4 rotundatæ carnosæ, sepalis alternant et ovar. basin cingent. ov. pilosissim. stylus filif. erectus, stigma clavata luteum.

Ovar. 1-locul. 2-ovulat. ovulis funiculis brevibus sustentes, foram. loculi fundum versus spectans.

Hab. In sylvis. Mergue : *Jan.* 1834. Vidi speciem hujus generis florifera, Moulmein.

Rhopala excelsa Roxburghi Helicia monent. R. Br.

PETROPHILA.

Petrophila pulchela.

Perianthum 4 sepalum in tubum complanatum conniventibus. Antheræ in foveis sepalorum oblongæ ovarium lateribus utrisque pulcherrima sericeum, stigma fusiformis.

Inflorescentia strobiliformis bracteis cordatis acuminatis, apicibus brunnescentibus.

Sepala decidua 2 superiora et 2 inferiora conniventia remonentia grosse et præsertim ad apices.

Folia glabra ramulis albo velutinis *v.v.* e in *H. B.* qua flores julio. Petrophila pulchella.

AQUILARACEÆ.

AQUILARIA.

Aquilaria Agullocha.

Per. campanulat. tubo partit. laciniis ovatis patentib. pilosis æstivatione imbricatis æqualibus.

Stam. monadelphia in tubum calycis conformat. arcteque applicitum coalita, 10 alterna fertilia, 10 sterilia squamiformia, dense barbat. Filam 10 antherifera, glabra, 10 sterilio pilossissime exserta subæqualia. Anth. erectæ subexsertæ bilocul. longit. lateraliterque dehiscentes.

Stylus brevissimus. Stigma capitat.

Ovarium pilossissim liberum, 1-loculare, dissepimentis 2 parietalibus valde incompletis, 2 ovulat. Ovula parietalia pendula ab apice locul. foramen superum hilum prope.

Arbor. ramis hirsutis, fol. alternis exstipulatis lanceolato-acuminatis integris venis secondariis margines usque currentibus. Paniculis compositis racemoso umbellatis, floribus inconspicuis. Cl. Lindley ait "foramen ad apicem ovuli" an recte? ob ovuli formam potius hilum prope.

Ex siccam speciem Cl. Lindl. donat. Mergue: *Dec.* 1834.

Primo aspectu, stam. vere perigyna, filam. in tubum calycinum decurrent, fauce squamis 10 appendiculata, tuboque calycis piloso, sed stamina et squamæ dissectione calycis parietibus separabilia, nec accreta sed mere applicata sunt tubo calycino.

HERNANDIACEÆ.

Hernandia.

Hernandia ovigera.

Ramuli robusti, fol. alternis exstipulatis supra lucidis. Paniculis corymbosis, paullo supra axillares.

Habitus foliationis Euphorbiaceus, vernatio conduplicata.

Pedunculis partialibus umbellatis. 3-4 floris. Bracteis 3-4, involucelli modo nunc disposit. nunc uno dislocat.

Fl. monoica suave oleatis.

Masc. tuba subnulla sepalis 3 ovatis sub coriaceis imbricatis æstivat. patentibus. Pet. 3 alternant erectiuscula.

Stam. 3 antherar. valvis revolutis, sepalis appositis, filamentis brevibus utrinque staminodio auctis, corpusculis interioribus interjectis.

Pollen Aurantiacea.

Fæm. Calycis tubus ovulis, calyculo semi-inclusus. Sepalis petalis 4. Stam. 4. staminodia sæpius obsoletis.

Stigma magnum reniforme fungoid, stigmatic canal open.

Ovar. 1-loculare inferum ovulum 1, pendulum, raphe enormously prolonged beyond the base of the nucleus.

I see no mention made of the valvate dehiscence of the anthers! Lindley places it near Thymaleæ although every thing points out its affinity to Laurinæ and especially to Illigeraceæ from which perhaps it is scarcely different but I have not seen the seed.

The calyculus of the females is well worth bearing in mind, with reference to Santalacea and Loranthacea.

In these valvular anthers the loculi are only two, and instead of dehiscing along the centre, the whole of the anther separates anteriorly along the connectivo.

The anther of Hernandia represents exactly a leaf with a thick midrib, the lamina inflected to the midrib. To reduce the ordinary 4 locular antero-posterior type, they ought to have a septum in the centre, and each part a line of dehiscence along the centre. See Pl. DXXXV. Fig. II.

Are they due to confluence of the anthers or are the anterior cells alone developed. How are they to be reduced to a type in which the dehiscence takes place along margin of the leaf.

THYMELACEÆ.

Cansiera.

Cansiera zyzyphifolia, Gr. Pl. DXXXVII. Fig. I.

Frutex scandens, fol. alternis coriaceis carnosis concavis ovato-acuminatia subintegris basi triveniis, cæterum venis secondariis paucis distinctis, æstivat. conduplicat.

Spicis axillaribus, foliis multo brevior media supra florigeris velutinis uti partes novellæ.

Flores bractea parva inconspicua suffult, ivirides, inconspicui.

Perianth. urceolatum, extus papulosum, tubo nempe e basi globoso-constricta, limbo 4-fido laciniis late ovatis ½ patentibus, æstivat. valvato-angularis.

Stam. 4, petalis opposita his medium fere usque adnat. inclusa. Anth. biloc. oblong. introrsæ.

Glandulæ 4 staminibus altera, magnæ e basi cordato cuspidato acumina as high as the adhering part of the filaments.

(With these 4 other small glands, as it were are incorporated with base of ovarium alternate.)

Ovarium oblongum conicum, stylus brevis. Stigma 4-lobum, lobis laciniis perianth altern.

Ovulum unicum conicum medium ovarii paullo supra.

1. Portion of inflorescence.
2. Flower.
3. Do. laid open.
4. Gland externally.
5. Stamen in front.
6. Do. transverse section of anther.
7. Pollen.
8. Pistillum.
9. Ovulum and placenta.
10. Do. do. of a bud, $_1\frac{1}{2}{}^0$ appearances decidedly Santalaceous.
11. Long section of fruit.
12. Base of albumen.
13. Long section of do.
14. Embryo.
15. Do. cotyledons separated.

Drupa globosa basi perianthio explanata stipata, apice nuda. Caro rubra mediocris. Putamen osseum, basi areolato depressum, apice minute apiculatum.

Semen conforme erectum ? basi foveolatum cruciatimque sulcatum into the foveole the basilar eminence of putamen, fits, from this radiate 4 vascular fascic. Between this and the putamen, is a thin torn coat adhering however generally, rather to the albumen than to the putamen, adhering firmly and on one side of the putamen about middle a placentiform mass corresponding to which there is a depression in the seed, centre brown, looking like a radicular punctum, but not so.

Embryo inversus axilis, paullo curvatus to the centre of the placentiform mass the teguments adhere, the seed is therefore properly laterally fixed.

Hab. In woods Malacca.

Proxima Champereya non obstante perianth monophyllo.

Habitus Pentameris Osyridis.

Hort. Botan. Calcut. *May* 1843.

Champereya.

Champereya sp. Pl. DXXXVII. Fig. III.

Arbor. ramulis flexuosis subcompressis fol. alternis exstipulatis oblongo-ovatis acuminatis repandis coriaceis supra atro-viridib. glabris. Paniculis axillaribus vel e ramis ortis racemosis, racemis divaricatis, floribus viridibus quam maxime inconspicuis, minimis. Pedicellis brevibus crassis.

Cal. 5 sepalus, sepalis oblongo-ovatis. Pet 0.

Stam. 5 sepalis opposita patentia, hypogyna. Filam. filiformia. Anth. ovatæ bilocolo medio affixæ longitud. lateraliterque dehiscent. Pollen album ovata læve hinc sulcatum. Discus hypogynus 5-gonus sublobatus intra stamina, ovariumque.

Ovar. liber. disco occultum. Stylus ejus longitud. exsertus crassus. Stigma simplex obtusum, 1-loculare, 1-ovulat. ovulo erecto foramen inconspicue ad apicem ovuli ?

Fructus oblongo-ellipticis racemoso-paniculata, pedicello brevi robusto insident. basi sepalis minutissimis 4, patente stipatis, apice stigmata notat.

Epicar. rubro-aurantiacea tenue chartac. Mesocarp. luteum tenue baccat. Endocarpio albidum subligneo fragili, intus vestit. membran. tenuiss. adherent. venos. apicem minute mammillat.

Semen conforme erect. apicem minute mammillat. tegument. 0.

Album copiosum carnosum basi excavat. sub 3-lobum. Embryo albus inversus an axin dimid. albuminis supera. Radicula longa clavata omnia inclusa in albumen !

Cotyledones 3 elongatæ dorso plano convexæ ventre trigonæ, *æquales*. Basin albuminis tubo persist. sphacelat. percursa.

a. Embryo.

b. Endocarp.

g. ditto.

c. Mesocarp, *k* ditto.
d. Epicarp, *i* ditto.
e. Tube.
f. Albumen.
Pistillum and ovulum, Pl. DXXXVI. Figs. *a. b.*
Hab. Mergue: *Jan.* 1834. Char. Exocarpi subacc edit. Santalaceis affinis, ovario supero.

Enkleia.

Enkleia malayana Gr.

Perianth. tubulos. imbricatum ferrugineo-pubescens, tubus cylinderac. lamina 5-fida laciniis ovatis, margine inæqualibus.

Squamæ totidem alternantes, bifidæ albæ petaloideæ fauci insertæ.

Stam. 10-biseriata seriea superior fauci inserta sepalis oppositis, inferior. tubo demissius inserti. Anth. subsessiles, adnatæ, loculis linearibus, introrsæ, longitud. dehiscentes (vasul. ad basin desinent) Pollen luteum glabrum.

Ovarium superum villosum. Stylus brevis cylindraceus. Stigma album valde papillosum capitatum sub 3-lobum, vasc. fasc. styli 3.

Ovulum 1 magnum pendulum anatropum.

Rami inflorescentii paniculati, medium versus fol. 2 parva subopposition canaliculati gerent. apice spicato, capitellatos flores paucos gerentes. Capitul. quodque extrorsum, 1-bracteata, bractea fol. ramulinis similimis sed minor.

Flores inconspicui fuscescenti-virides.

Frutex scandens cortice ramulor. ferrugin.

Fol. opposita breve petiolata, oblonga basi subcordata obtusa coriacea venis secondariis insignibus oblique arcuatis ope ramulor (immersorum) transvers. nexis ut in quibusdam Briedleis.

Floralibus fuscescent. subopposition vel alternis canaliculato-concavis fructiferor. ramulinor. ampliat. scariosa reticulat. venosa, fusco-brunnescent planiuscula.

Fructus deflexo-pendula sessilis peduncle strictis. Pedicellis crassis brevis, subturbinatis basi nudi vel perianthio spathaceum fisso, globoso conico apiculato paullo immatura subdrupacea, 1-locularis, 1-sperum.

Semen 1 pendulum conform.

Tegumen outer thickest greenish, inner membrane very veiny! raphe marked on the outer broad ½ complete, multipartite, albumen 0.

Cotyledones magnæ albæ subhæmisphericæ, extus quasi venosæ with impressions of the veins of the teguments. Plumula inconspicua.

Hab. Malacca. Bhatto Burndan.

It is among these plants that we have an apparently simple ovary, and the style truly terminal; but it by no means follows that all the ovaria are really simple, although the presence of 3 vassels is nearly as compatible with a simple as with a ternary ovary.

Gen. Char.

Spicæ vel racemi paniculat. medio bifolio floralibus.

Flores nudi, articulati in pedicellis brevissimis.

Per. tubulos. 5-fida laciniis imbricatis.

Squamæ faucinæ totidem petaloideæ bifidæ, inclusæ.

Stam. 10 biseriata. Anth. biloc. longit. Ovar. 1-loculare ovulo pendulo.

Stylus brevis. Stigma capitat. papillos.

Fruct. peduncul. fol. flor. ampliata planifacta scariosa, reticulato-venosa drupacea, 1-sperma. Sem. exalbumen.

Habitus peculiaris. Ramuli uncinatim decurvi.

Fruit marked by two opposite longitudinal whitish yellow lines, also with a tendency to being veiny, its white spots are stomata, I have a Mergue species of the same family in which the inner tegmen of the riper seed at least, is very veiny the outer in this appears to have none except the raphe.

Passerina.

1. *Passerina diarthronoides* Gr. Pl. DXXXIV.

Annua erecta, varians spithamæa usque ad 2 pedales, ramis paucis, virgatis sæpius nutantibus, caule ramisque viridibus glaucescens, gemmis ex axillis foliorum infimor. lapsiso.

Folia ascendentia alternanta linearia utrinque paullo attenuata, acuta cum mucronulo, vena una indistinct. utrinque cellulosa aspect.

Flores subsessiles in axillis, vel terni vel plures, uno exaxilla folii, duobus lateralibus inferioribus ex axillis bracteæ ovatæ subcarinatæ, reliqui nudi? basibus omnia pilis longiusculis obsitæ.

Inflorescentia centripeto et partialis et generalis.

Flores minuti inconspicui, demidium superius ochroleuci inferius virides.

Perianth. subcylindraceum, sepaloideum ad anthesin viride cito postea dimidio supra colorato ochroleuco et obturbinatulum evadit. extus hirtum pilis uncinatis, limbo valvato carnoso, 4-partito.

Stam. 8 in filamentis brevibus, ad faucem inserta, biseriatim, serien supera majora laciniis opposita, infera minori alternantia cum his et in filamentis longioribus, introrse. Anth. biloculare longitud. dehiscentes.

Pollen magnum croceum globosum in aqua immersa, circumcinctum cellulis radiantibus ! subirregularibus, tegumento hoc externa demum solubila.

Pistillum omnino superum, quamvis examinatur primar. apparet inferum oblongum tubum perianthii implens, subobliquum apice hirtum.

Stylus brevis sæpius curvatus stigma capitatum, on a level with the upper anthers.

Ovulum unicum pendulum ex lateo apicis locul. foramen hilum prope.

Fructus perianthio immulato recondit. Carpellum cellulosum, et inferne valde attenuatum.

Semen pendulum, tegument exterius atro-brunneum, chartaceo-osseum, interius membranaceo-cellulosum album.

Albumen 0! Embryo inversus (quoad plantæ axin) radicula longa conica.

Cotyledones carnosæ oblongæ obliquissimæ. Plumula inconspicue.

1. Plant ½ natural size, chief branch incomplete.
2. Fascicle of flower in an axil.
3. Flower.
4. Do. open and spread out.
5. Stamen front view.
6. One of the larger and upper stamina after dehiscence, (dry) front view.
7. One of the lower ditto shewing its longer filament.
8. Pollen dry.
9. Immersed in water, the lower globule has its outer coat dissolved from longer immersion.
10. Long section of pistillum.
11. Ovulum.

11*a*. Ditto seen under pressure.

12. Perianth of fruit half developed.
13. Ditto of ripe fruits.
14. Capsule separated from the perianth.
15. Ditto long section, *a* pericarpial walls, *b* outer osseous coats of seed, *c* inner cellulo-membranous do. *d* embryo.

15*a*. Transverse section of fruit, *a* pericarp, *b* osseous coat of seed, *c* cellulo-membranous, do. *d* cotyledons.

16. Embryo, one cotyledon removed, shewing the plamule indistinct.

Hab. Affghanisthan in turfosis dumidiusculis agrorum, per totam plagam fere.

Sp. Char. Ramis virgatis foliis linearibus floribus in axillis aggregatis. Perianthio hirto persistent fructus e costatus. Stigmat discoideo, æstiv. valvat.

Planta intermedia inter Daphnaceus, et Santalaceaus.
It certainly belongs to Thymeleæ.
An Passerina, Diarthron affinis, etiam.
Itinerary Notes *p.* 295, *no.* 924.

2. *Passerina costata* Gr. Pl. DXXXV.

Planta annua erecta, statura varians sæpe ramosissime corona lata. Cortice tenaci-fibrosa ramis inferioribus suboppositis, plus minus nudatis, foliis alternis, subsessilibus ascendentibus subsecundis, glaucis lineari-spathulatis, utrinque pubescente pube tenui longiuscula, simplice sæpius concava univenia.

Flores in racemis terminalibus filiformibus demum elongatis, nudis, articulata in apicibus dilatatis pedicellorum brev. subtetrasticha.

Perianth. medio constrictum supra hoc subpetaloid, infra viridescens, tubo oblongo apice 4-lobo, lobis 2 majoribus, in æstivation exterioribus subcarnosis, extus pubescens, infra medium et in parte ovario respondente, costis 8 undulatis distinctis.

Stam. 8, biseriata ut in præcedente, filamento filiformia subæqualia, anth. oblongæ bilocul. longit. dehiscent. introrsæ. Pollen rotundum glabrum in aqua immulat. iterum examinand.

Ovarium in parte tubi oblongo recondit glabrum oblongum, uniloculare.

Ovulo unico pendulo e latere apicis loculi, conforme. Tegument. unicum? foramen superum hilum prope, stylus subclavatus gracilis decidius, stigma oblongum papillosum capsula, tubo calycis immulat. scarioso, albo facto, recondit. viridescens, cellulosis indehiscens. Semen pendulum, capsulæ conforme.

Tegument exterius osseum atratum. Interius album membranaceo-cellulosum. Embryo ex albuminosus, præcedentis, radicula supera.

1. Portion of a large specimen nat. size.

1*a*. Portion of inflorescence.
2. Alabastrum.
3. Flower, lobes not sufficiently expanded.
4. Ditto laid open.
5. Partium situs et alternat.
6. Stamina front and back view.
6*a*. Ditto after dehiscence.
7. Pollen immersed.
8. Pistillum long section.
9. Ovula viewed under pressure.
10. Flower.
11. Ditto long section, *a* capsula, *b* seed outer tegument, *c* inner ditto, *d* embryo (longit central line wrong.)
12. Ditto transverse, *a b c d* as above.
13. Embryo.

Hab. Common all over Affghanisthan, generally in old or newly cultivated spots or in barren ground, it varies extremely in stature.

Sp. Char. Racemis pluribus erectis, foliis dense pubescent, floribus spicato-racemosis, tubo medio constricto *dimidiato*. Stigmata oblongo calyce fructus, dimidio supero lapso infero 8-costato.

A genus which it appears to me is intermediate between Thymeleæ and Santalaceæ approaching much more nearly the former than the latter, with which it assimilates in the tendency to valvular æstivation and pendulous ovula.

To the former in tenacity of bark, habit, stamina, and free ovary.

Cabul: *August* 10*th*-12*th*, 1839.

Leptonium.

Leptonium oblongifolium, Pl. DXXXVI.

1. Portion of young inflorescence.
2. Ditto at expansion of central flower bracte cadiceous.

3. Bud laterally.
4. Ditto nearly vertically.
5. Flower.
6. Ditto perianth laid open.
7. Front
8. Back } of Anther.
9. Anther burst in front.
10. Pollen.
11. Pistillum.
12. Placenta and Ovulum.
13. Fruit.
14. Ditto long section.
15. Ditto ditto albumen.
16. Embryo.
17. Ditto cotyledons partly separated.
18. Ditto completely.

Drupa oliviformis (4-plo minor) sessilis apice nuda, basi depresso subannulato putamen fibroso-osseum.

Semen 1 basi affixum inter hoc et putamen parietem interiorem tegumen tenui lacerat. membranacie cellulosa, apice putamin. adhærens, et etiam albumini, apice hujus conica excepto.

Albumen copiosum carnosum apice conico nudo. Embryo inversus axilis. Radicul. nudo obovato, oblonga mediocris supera.

Cotyledones 3, *lineares*, intus carinati apices versus cohærentes connatæ ? Plumula inconspicua.

This represents pistillum and ovulum of Champereya.
H. B. C. *May*, 1843.

Daphne.

1. *Daphne* sp. Pl. DXXXVIII.

Frutex 4 pedalis, cortice griseo, fol. articulata. leviter repanda supra saltem seniora saturati-viridia, infra glaucescento-albida reticulataque, flores capitati albi pubescentes, limbo carneo, anth. flavæ, odor mellitus.

Journey from Assam to Ava. Specimen unicum tantum legi. Patkye *Yoommam*, alt. ped. 4500.

2. *Daphne cannabina.*

Frutex, erectus, 6-7 pedalis, fol. alternis exstipulatis, lanceolatis utrinque acuminatis repandis, floribus, capitatis albis, subodoratis capitulis terminalibus.

Per. hypocraterif. tubo $\frac{2}{3}$ uncialis, 4-partitum.

Stam. 8 inclusa biserialia, 4 inferiora majora medium tubi versus inserta, utriusque serien alternatim, perianth. laciniis opposit.

Stylus brevis. Stigma magna capitula. Ovar. basi annulo glanduloso cinctum oblongum, 1-loculare, 1-ovulata (abort.) ovulo pendulo foramen hilum prope.

Hab. Churra Ponjee: *Oct.* 11*th*, 1835.
Daphne cannabina, Lour vix D. Indica, ex Donio.

Jenkinsia.

Jenkinsia assamica Gr. Pl. DXXXVII. Fig II.

Frutex scandens, volubilis in cortice paleis brevibus subulatis asperata.

Fol. alterna in petiolis basi paululo supra articulatis ibidemque incrassatis teretiusculis oblongo-obovata sæpius oblique acuminata cum mucrona obtusiuscula subintegra, venis secondariis arcuatis mutuo sed irregularibus nexis, interstitiis venis irregularibus sub transversio-divisis, interstitiolis reticulati-

venulosis, stomata paginæ inferioris tantum ad sunt, cuticu læ cellulæ sinuosæ, superioris irregularis vix sinuosæ.

Ramuli ut etiam floriferi sæpius paulo supra axillares.

Fructus capitata, pedunculo furfuraceo subunciali suffulte erecto, 2-5 aggregato distincte baccato, oblongo ovato compresso, stipite crasso insidentis, apice stigmata persistente capitato medio foveolato coronato.

Stipite cincto calyce campanulaceo, 4-partito, laciniis patento-reflexis, argenteo-furfuraceo.

Calyx circumcinctus basi bracteis 4, cordatis, laciniis alternantibus, mutuo unitis in cupulam brevem. Baccæ miniatæ coccineæ, longitudine $\frac{2}{3}$ unciæ latitudine $\frac{1}{2}$ unciali.

Semen unicum, magnum, pendulum ex apice baccæ cavitates, subovatum, compressum, secus lateram profunde sulcata, fauce utroque prominentibus 3 paullo elevatis flexuosis, inter se areolatim nexis notatum griseo-brunneum. Areolæ magnæ rugosulæ. Pulpa baccæ parieti seminis adhæret.

Testa coriacea sublignea crassiuscula superfice externa brunnea, cæterum alba, intus glaber, punctulis convexis areolis responbentibus intus undulata.

Tegument proprius tenuissimum, membranaceo-cellulosum albumen arcte vestens, albumen copiosum carnosum cavitati seminis conformes, extus angulatus, subareolatusque, conforming to the testa something, utrinque secus sulcam testi linea rubra notat.

Cotyledones carnosæ oleosæ? planæ axiles, albumini leviter adhærentes, an etiam inter se medio curvatæ marginibus repandis.

Radicula supera in hæmisphærica, albumin exserta. Plumula inconspicua.

Hab. Assam Prope Suddyah: *Feb.* 3*rd*, 1836.

De cotyledoni forma et earum mutua adhesionem haud certior. factus sum, unicum fructum tantum examinavi, et quoad cotyledones infeliciter.

In descriptionem supra, semen pro putamen habenda, con-

tinens semen pendulum unicum, cum tegument simplex tenuissimum, hinc raphe lineari-simpliceo notat.

Chalaza macula indistincta brunnea apicem geometricam seminis prope in Iconenemis dictincta. Chalaza e textura mucilaginoso-fibrosa.

Cotyledones e marginibus et radicula albumina tenuissimo tectis, albumen in super radicula in membranam fere redactum.

Genus novum Thymeleæaria.

Flores capitati. Perianth. campanulat. 4-partit. basi involucra 4-fido suffult.

Drupæ stipitatæ, pyrena anguloso-areolata in albumen copiosum.

Frutex scandens, hinc illinc cortice subfurfuraceus tenacea foliis alternis, oblongo-obovatis, in petiolis articulatis. Baccis miniato-coccineis.

Linostoma.

Linostoma decandra.

Fruticosa, ramulis compressis, fol. lanceolat. oppositis, acuminatis integris, floralibus discoloribus sessilibus basi subcordatis racemis paucifloris axilla terminalibusque, floribus majusculis.

Cal. tubo cylindrica elongat. profunde 5-partit. laciniis lineari-lanceolat. reflexis æstivatione imbricatis, 2 exterioribus.

Squamæ carnosæ clavatæ sepalorum numero duplo, fauci inserta, alterne sepalis opposita.

Stam. totidem fauci inserta alterna breviora sepalis opposita. Filam. longiuscula filiformia. Anth. adnatæ, bilocul. longitudinaliter præsertim apices versus dehiscent.

Pollen magnum globosum hispidum, stylus filiformis basin versus pilosus.

Stigma conicum capitat.

Ov. liberum tubo calycis omnino inclusum, pilis niveis hispidissimum 1-loculare, 1-ovulat. stipitat. vel basin versus solidum sterileque. Ovul. pendulum ab apice loculi, foramen conspicuum hilum prope.

Hab. Mergue: *Jan. 9th*, 1835.

Nectandra decandra Roxb.

ELÆAGNEÆ.

This order agrees with Olacineæ in one remarkable point, that the calyx is analogous to an adherent calyx.

In Elæagnus, this is carried so far that dissection is absolutely requisite to detect it, and is accompanied with a development of a glandular disk, precisely similar to that of epigynous orders. The style too separates above its base.

There can be no doubt but that the Perianth is truly calycine.

The ovary is essentially simple, it has one vascular facicle that is prolonged upwards into the style, and which corresponds to the costa of ordinary leaves.

The placental suture is distinguishable, but merely by a line of different tissue, for no furrow exists as ordinarily happens. The stigma is also essentially simple.

The ovulum has the ordinary structure, its raphal face appears to correspond to the placental line above noted as indeed it should.

The stomata are very minute and are to be found only on the under surface. This is curious, one would have supposed that some compensating process would have existed, owing to the great obstacles to free ingress and egress of air presented by the scales, but unless these have some influence, I can see none.

These scales are maxima developments of facicled or stellate hairs, and they return to this state on the upper surface. The importance of these bodies is obvious from their general occurrence in the order.

The stamina are evascular.

And so is the perianth except in the axis of the laciniæ.

The greater permanence of the styles or stigmata is in addition remarkable from its being opposed to that which usually occurs. The parts next the axis being those most developed, and one would in reasoning a priori, imagine that the upper part of an organ which must be a continuation of the lower part, could not exist independently of this.

ELÆAGNUS.

1. *Elæagnus fasciculatus*, Pl. DXXXIX. Fig. II.

Fruticosa inermis, fol. lanceolatis mucronato-acuminatis utrinque sed subtus dense lepidotis, subrepandis, integris ramulisque novellis argenteo-lepidotis.

Fructibus in pedicellis lepidotis æquantibus varie numero aggregatis in axillis foliorum, vere racemosis, pedunculo brevissimo tri-binati-globosis, apice depressis et quasi unbilicatis, sinu conum brevem exserente, rubris, lepidotis.

Pericarp. calycis basin ampliato baccato adhærente inclusum, obovato-turbinatum utrinque conicum, cono supero stylum affingente, late sulcata lignea. Endocarpio tenuissimo solubili imo partio cum semine separant. 1-loculare, 1-spermum.

Semen erectum fere globosum ex albuminosum obsolite sulcatum. Tegumentum unicum tenue e tegmentis 2 conflatis, quorum exterius membranaceum, tenuissimum, cellulis sinuosis, interius cellulosum.

Raphe linearis nec prominula.

Chalaza puncta apiculis brunnea.

Radicula ovata brevissima crassa, infera ad hilum latus.

Cotyledones raphe parallelæ carnosæ, plano-convexæ fere hæmisphæricæ, basi emarginatæ.

Plumula diphylla subviridis.

HAB. Assam Burrumpootur : *April 5th*, 1836.

Micropyle inconspicua, e foveola depressa laterali. e costæ vel subcompressione orto caule distinguenda, raphe simplex,

e fasciculis endocarpii distinguenda in tegumentum cellulosum currens.

2. *Elæagni* sp. Pl. DXXXIX Fig. I.

Hab. Bootan at Punuka.

3. *Elæagni* sp.

Arbor vel frutex. Ramulis petiolis, foliisque subtus (his que præsertim) squamis peltatis laciniis argenteis tectis, fol. ovatis acutis repandis subintegris glabris.

Racemis axillaribus abbreviatis, pluriflоris, floribus argenteo-citrinus suaviter odoratis.

Per. gamosepala, tubo basin versus rotundato, superne petaloideo-obtuse 4-gono, limbus 4-partit. laciniis ovatis patulis, æstivatione valvatis, intus pilosis.

Stam. 4 fauci inserta laciniis alternantia, filamentis brevibus plano-subulatis, lateribus basin dilatatis et inter se adnatis, adeo ut annulus faucinus brevis 4-angulus formatur. Anth. medio affixæ bilocul. longit. lateraliterque dehiscentes. Pollen globosum læve.

Stylus subulatus basin versus pilis longiusculis stellatis hispidus. Stigma simplex obtusum.

Ovarium glabrum tubo perianth hasi circumsciss. obtectum, 1-locul. 1-ovulat. ovulo erecto foramen conspic. hilum versus.

Hab. Mergue an culta : *Nov.* 1834.

SANTALACEÆ.

Santalum.

Santalum myritifolium.

Perianthium $\frac{1}{2}$ superum 4-partitum, intus coloratum, æstivatione valvata. Pet. 4-perigyna, glanduliformia, sepalis alterna.

Stam. 4-perigyna. sepalis opposita, ad basin *laciniarum* inserta. Filam. filiformia, basi præcipæ extus pilis

perianthio originem ducentibus, suffulta. Anth. terminalis, introrsæ, biloculares, longitudinaliter dehiscentes. Pollen ?

Ovarium semi inferum oblongum, 1-loculare, 1-ovulatum, ovulum primo pendulum demum erectum foramen ad ejus apicem ? Stylus filiformis, stigmata 3-4 capitata papillosa. Ovarium adultius paulo infra basin styli circumscissum, uti linea sphacelata obviam facit.

Petala (glandulæ auctorum) petalorum situm occupant. mere in statu anamorphosis sunt. Pila a Linnæo tantum descripto sunt. Filam basi deorsum pilis ramentacea. In mea exempla pili plurima seorsum, pauci minores deorsum spectant. omnino filamentis discreta sunt.

In floribus, paulo post florescentiam, pili filamenta fere obtegunt. post anthesin multo minus conspicua fiunt.

Flores primo virides sunt, demum pagina perianthii interior rubra fit.

Arbor potius frutex, foliis oppositis exstipulatis integris, lanceolatis. Inflorescentia racemoso-paniculata, terminalis. Pedicelli articulati, ad basin bracteati, bracteis caducis.

HAB. Bengal: *Oct.* 4*th*, 1835.

OSYRIS.

Osyris nepalensis, Pl. DXL. Fig. I.

Itinerary Notes, p. 128, *no.* 427.
HAB. Bootan.

PODOSTEMACEÆ.

PODOSTEMON.

Padostemon Griffithii. Pls. DXLI. Fig. II and DXLIV.

Plantula aspectu omnino fuci, axi verro nullo, e fronde orbiculari, lobato, in saxis semi-inundatis arcte adhærenti, viridi, lucido, somewhat slimy, constans, e disco promis-

cue flores numerosissimos exserens, sinubus loborum exceptis ?

Pedunculi brevissimi, squamis (bracteis) viridibus, distichis imbricatis, ovato-triangularibus, interstitio inter angulos 2 internos concavo et pedunculum amplextent. substantia demum angulum externum versus corneâ, primo cæteris partibus multo-viridioribus.

Spatha membranacea, sub anthesin subbivalvat fissa, dentius persistens sed demum labens. Per. nullum.

Stamen unicum, lateraliter in apicem pedunculi brevissimi situm, respectu frondis superficiei semper internum, respectu centro axisve externum ?

Filam. sursum arcuatum,carnosum, rubescens, basi utrinque processu setaceo-celluloso apice oblonga glanduloso summo apice recurvo auctum, apice bifurcatum, furca utraque extrorsum flexiusculâ, et stigma internum, vel externum quoad axin plantæ, amplectenti.

Antheræ cujusque furcæ, basi affixa, oblonga, bilocularis, fere didyma, loculis basin dehiscentiam subdivaricatis, lateraliter et longitudinaliter dehiscent. insertione obliquis, externo demissiore.

Pollen compositim e sphærulis 2 simplicibus lævibus, e sulcatis ? post immersionem etiam cohærentibus.

Filam evaculosum. Endothec. cellulis vix fibrosis.

Ovarium ovatum, acutum, breve stipitatum, stipite demum immulato, extus cellulosum cæterum læve, 1-loculare.

Placenta centralis carnosa conformis, ovulis undique tertia, septo adnata ideoque utrinque alato-marginata.

Stylus 0. Stigmata 2 triangularia (angulo tertio infero) cellulo-papulosa, rubra sub repanda carnosa, internum quoad stamen majus.

Ovula oblonga angustiora quam in P. Wallichii, viridia, extus celluloso-papulosa ; tegumentum exterius (et unicum) cellulosum, internis membranaceum, moleculas mobilis continens, omnino ut in P. Wallichii et nucleum componens.

Fructus capsularis ovatus, utrinque æqualis subacutusque, pedunculum brevem ipso duplo 3-plo breviorem terminans (stipite proprio non elongato, pedunculo duplo breviore.) Pedunculo demum nudo, lamina interior capsulæ, decoloratæ e cellulis transversa dispositis formata.

Capsula costis sub 16.

Semina oblonga, (immatura) omnino ut in P. Wallichii, Nucleus obovatus, parte attenuata supera, basin affixus.

Obs. The fronds of this plant are coriaceous, the cells of both cuticles? being oblong. The intermediate substance being white cellular and somewhat lax, it has no stomata.

Each axis of inflorescence is perfectly distinct, the frond moreover is entirely cellular, these axes appear at their bases to perforate the substance of the frond, and to be applied to the surface of the body over which the frond is spread, on detaching them, small round holes are left, perforating the frond completely, the same thing is visible on old plants, the frond of which appears to be a brownish thickish lobed film. spread over the stone, its surface being frequently perforated.

In very young flowers there is a central axis to the filament as well as to each of its crura, running to the connectivum. I can say nothing as to its vascularity, the filament and its crura are at this time very short, and not developed in the same ratio with the subulate processes.

The ovula at the same period are cellular oblong without any opening.

The capsules seem to be formed of 2 carpellary leaves, each of which has 5 costæ exclusive of 2 marginal ones of $\frac{1}{2}$ the size, by approximating these, we have the capsule 12-costate, the costæ formed by the margins of the carpellary leaves being duplicate and formed on both leaves. The dehiscence will I think be bivalvular, and septicidal. There is no septa attached to the parietes of the ovarium, but the placenta is certainly adnate to a septum, whose membranaceous margins project somewhat on either side.

2. *Podostemon Wallichiana*, Gr. Pls. DXLI, DXLII, DXLIII.

Planta minima, facie Hepaticæ cujusdam, acaulis (an vere) fronde depressa, planiusculi-lobata lobis sinuatis, sinubus omnibus florem exserentibus, coriacea, pallide viridescens, textura fuci, pede brevissimo textura crassiore magisque coriaceo, subdisciformi rupibus inundatis in rivulorum cursubus provenientibus arcte affixa.

Folia vera nulla, ast eorum loco frons, bracteoque pedunculorum basin cingentes.

Pedunculi solitarii uniflorum e sinubus loborum frondis origin. ducentes, maturato, 5-7 lineales, basin bracteis dense agregatis alternantibus, fere textura frondis, coloris magis herbaceus, difformibus crassis cellulosis, intus peduncula prope canaliculatis, et eo appressis cæterum ascendentibus, inferioribus multo minoribus, axis vasculosa unica donatis.

Pedunculus e sinu spathæ tubulosæ cellulosæ apice multifidæ, et dilatatæ erumpens filiformis peripheria albidus, intus centrum versus ruber crassus filiformis, post anthesin cito attenuatus gracilis fere capillaceus, spatha androgyna.

Flos terminatis masculus semper externus quoad centrum frondis, ab initio spatha omnino tecta tuncque pedunculus curvatus, demum peduncul. elongato striato exsertus fit.

Perianth. nullum.

Stamina monodelpha, columna arcuatum, crassam filiform. basi utrinque processu celluloso initio rubro setaceo sæpe apicem versus introrsum vel stamini contrarie geniculat. filamento breviore stipatus, tertio interdum breviore dorsali super addito paullo infra furcam filamenta.

Filam apice bifurcatum, propria brevia antheræ longitudine glabra ut commune læviaque.

Anth. basin versus affixa 1-bilocularis cuique furcæ introrsæ, longitudinaliter dehiscentes fere didymæ.

Pollen læve composita e sphærulis 2 connatis, et post dehiscentia nec separantibus.

Ovarium ovato-lanceolatum, eodem plana cum stamina

exsertum, sed semper internum, obsolete 8-costatum, sæpe læve.

Stylus nullus, stigma carnosum bilobum, subbilabiat. lobis conico-subulatis, interiore semper longiore et inter antheras flexo, saltem per anthesin.

Anth. loculis insertion. subobliquis, exteriore inferiore.

Ovar. nitidum 1-loculare, septis 2 longitudinalibus incompletis, rubris, et e foliis carpellariis 2 format. quorum unicum externum unum internum (ex situ stigmatorum.)

Placenta centralis ovato-conica, basi et apice tantum affixa, undique ovulis tecta.

Ovula carnosa viridia! oblonga foramine obsoleto.

Tegumentum extus, cellulosum crassum, extus papulosum obcellulos fluido repletos, iutus tenuissime membranacea, moleculus minutas difformes, mobilis ut etiam extus, copiosa continens, oblongum.

Capsula immatura in peduncula nudo gracila insidens, breviter stipitata. Spath. nempe caduca et stamen et processus setacea form ovarii 1-sulcat. nempe costæ cuique folio carpella 5 et 6 exeorum marginibus ortis ideoque duplicatis.

MONIMIACEÆ.

Sarcodiscus.

Sarcodiscus chloranthiformis, Gr. Pl. DXLV.

Flores fæminei solitarii vel in pedunculo bi-sæpius trichotomo bi-ternarii. Pedicelli lutei clavati.

Involucrum urceolare, colore pedicellum, apice quasi 4-fid. laciniis biseriatis, 2 exter, 2 inter, subimbricat. intus process. carnoso in unam connivent. deflexa, apertum in æstivat. abturant: prædat. Stam. 0.

Ovaria filling the involucra, not numerous, uppermost and largest arising from the wall of the urceolus, inner from fundus, opposite the outer smaller one. Ovaria conica subu-

lata, pressione subangulata pubescenti, 1-locul. ovul. 1, pendulum ex apice loculi anatropum. Stylus substigma inconspicuum.

Of this Sarcodiscres, I had only seen the fruit, at first, it is aromatic with the habit of Chloranthus in some respects, the ovaria strikingly remind one of Anonaceæ, its aroma is also Anonaceous.

Frutex.

Internodiis elongatis ad folii *articulos* incrassat. fol. oppositis exstipulatis, petiolis sub $\frac{1}{2}$-uncialibus subterete! sulcatis, supra lamina elliptica, breviter cuspidato-acuminata, crenulata vel subdentato serrata-subcoriacea.

Venis 2-dariis, oblique arcuatis cum supera quaque conspicui punctis, cæterum reticulatis, venula centrali interveniar. 2-darium conspicua.

Fructus axillaribus, subcymosis, pedunculo partiale quoque subclavat. subuncial. apicem versus lutescens, discus magnus carnosus aureus subaurantiaceus, basi inferne planiusculus, marginem versus intus cicatrisubus, circa marginem sæpius lobulosus, lobulis apice ovariis vel perianthii lapsu cicatrisat. vel etiam in disco subirregulariter sitis.

Pedicelli fructigeri carnosi aureo-aurantiacei.

Baccis *anguste ovatis*, purpureo-cæruleis, basi nudis, apicem styli reliquis inconspicue gerent, uniloculares, 1-sperma carne pallida, cellulosa.

Semen, pendulum, magnum, forma fructus; tegument. chartaceo-membrana: cum fructu secedens, hinc apicem areolatem (micropyle).

Raphe lata, generally conspicuous as also broad, chalaza fucescent from coming way with the embryo.

Albumen copiosum carnosum extus præsertim supra medium viridescens, apicem prope albo-areolatum (situ radicis).

Embryo albus leviter curvatus subaxilis in album. dimid. supero.

Radicula longa clavata supera. Cotyledones ovatæ foliaceæ venosæ.

Sapor et odor contus piperaceus.

Perhaps in most of its characters it is Daphnaceous, indeed the leaves are not unlike those of Jenkensia.

1. Plant reduced ½ except fruit.
2. Fruit back view.
3. Ditto front.
4. Long section to expose the seed, *a* hilum, *b* raphe, *c* chalaza.
5. Long section through, the body of the seed, *a* tegument, *b* albumen, *c* embryo.
6. Seed detached back view, *a* funicle, very short, *b* raphe, *c* chalaza.
7. Same, as it generally separates with only a part of the tegument and raphe, and chalaza.
8. Ditto to shew the areola marking the site of the root.
9. Embryo.
10. Ditto one Cotyledon removed.

HAB. Malacca.

BALSAMACEÆ.

BALSAMIFLUÆ.

Balsamiflua *deltoides*, Pl. DXXVI. Itinerary Notes, p. 211, *no.* 73.

HAB. Affghanistan.

SALICACEÆ.

POPULUS.

Populus rotundifolius, Gr. Pl. DXLVI. Itinerary Notes, p. 172, *no.* 881.

PIPERACEÆ.

Schizonephos.

Schizonephos glaucescens Gr.

Caules articulati, articuli incrassates, fol. lanceolato-oblonga, petiola acuminata glaberrime coriacea supra lucida, subtus glauca, basin sub 3-venia, intra veniis reticulatis, concaviusculis.

Spicis terminalibus pendulis compositis luteis, divisiones frondiformi reniformes, breviter stipitati, margine anteriori fissæ floriferæ.

Flores dioici masculi tantum visi, intra fissuram recondit pilisque obsiti, uniseriati.

Flos masc. e stamen 1, filamento crasso. Antheræ terminales biloculares longitudinal, dehiscent.

Aromatico pungens.

Hab. Malacca at Ching. Scandens in Abor. Nhingull. Generally distinct from Piper; in the e bracteate flowers as in the inflorescence.

Habitus Piperis.

CHLORANTHACEÆ.

Chloranthus.

Chloranthi sp. Pl. DXLVII.

The habit is that of Piperaceæ, the wood consists of a continuous system with many medullary rays, the vessels are rather small, and the surrounding fibres punctuated. The pith abounds in amylaceous ? granules.

The external fibrous system is in juxta position with the bark and consists of several fascicles of irregular sizes, while the space between this and the ligneous system is filled up by very soft cellular tissue.

The cells of the cutes are sinuous, that of the under surface being alone stomatose.

The whole appendages of the axis are disposed in a regular binary manner, the flowers are regularly and decussatingly opposite.

The number of anthers I take to be 4, the two lateral ones being distinct, the intermediate lobe bearing two anthers; all these are quadrilocular, at least in the young state the upper loculi being much the smallest.

The ovarium is simple notwithstanding that the style can scarcely be said to be oblique, the stigmatic cannal is distinct.

The ovulum is attached to the inner side with respect to the axis and towards the summit, it is antitropous. The chief enlargement of the ovary after fecundation takes place towards its base, hence the scar by the falling off, caused of the filament appears to be carried up, until it becomes nearly terminal ?

The two coats of the ovule are distinct and the chalaza conspicuous spreading over the base of the nucleus, which adheres slightly to the inner integument.

It is the inner portion of the outer which subsequently becomes the drupaceous coat, hence the micropyle should be visible on it when mature.

The excavation formed within the nucleus is lined by an albuminary membrane excessively fine, it is in this that the albumen is formed. The embryo is of late appearance.

The micropyle becomes indurated and somewhat mamiliform; and is at this stage, which is before the appearances of the embryo, green.

Fructus: ovati utrinque obtusi, spicati, basi bractei squamiformi herbacei: coloris suffulti subbacati miniat.

Pericarpium crassiusculum carnoso-fungosum, intus parce venulosum, apice stigmatis reliquis coronatum, et obliquusculum ? 1-loculare.

Semen unicum pendulum forma pericarpii sed utrinque acutius.

Tegument. album, durum subosseum, membranes 2 quarum exterius tenuissime membranac. interius induratum.

Corpus album carnosum, succosum, hujus cavitatem omnino replens, albumen.

Embryo minutus, in apice albuminis locatus, albus, subglobosus, superne bifidus.

Radicula rotundata crassa.

Cotyledones minimæ, sinulato.

Hab. Assam. In sylvis Myrung: *Nov.* 12*th* 1835.

STILAGINACEÆ.

Gymnobotrys.

Gymnobotrys sp. Pl. DXLVIII. Fig. I.

Hab. Bootan.

URTICACEÆ.

Urtica.

Urtica naucleiflora.

Frutex scandens, fol. alternis, oblongis basi cordatis acuminatis subrepandis, penninervus subtus reticulatis. Stipulis deciduis lanceolatis? rubris.

Inflorescentia ex axillis foliorum lapsorum capitulata, capitulis globosis primo læte viridibus demum luteis in cymis pluries dichotomis, aromatica et suavissima odoratis dispositis.

Pedunculis rubris. Bracteis magnis ovatis concavis, rubris extus papillosum.

Per extus papillosum ad basin fere 4 partit. sepalis ovatis carnosis cucullatis, æstivatione valvatis.

Stam. 4 basibus sepalor. inserti, iis oppositæ et cucullis subinclusæ. Filam ovata carnosa breva. Anth. erectæ bilocul. longit. lateraliterque dehiscent. Pollen minutissim. ovatum

læve, stylus 4-gonus compressus stigma complanato truncato dilatat. Rud. ovarium parvum.

Anth. loculi maculis sanguineis.

Hab. In sylvis scandens. Ins. Madamaca: *April*, 1835.

An per 4 sepal, staminque hypogyna?

Habitus Cissi.

Bæhmeria.

1. *Bæhmeria melastomoidea*, Gr. Pl. DLXIII. Fig. II.

Basi decumbens et suffrutecosa, scabra, pedalis vel bipedalis.

Caulis ruber, angulatus, subanceps, pilis scabris lineatum dispositis asper, basi subteres.

Fol. (floralibus exceptis) opposita. linearia vel lanceolato-linearia, acuminata acutiuscula, breviter petiolata, trivenia, marginibus hyalinis pilis ascendentibus scabris, albopunctata, venis secondariis transeverse anastomosantibus.

F. floralia alterna, infima subopposit. Petioli rubri. Stipulæ *f.* caulinorum interpetiolares, demum deciduæ floral. solutæ, cuneato-ovatæ scariosæ, fuscæ.

Flores monoici pauci in axillis aggregati, bracteis minutis suffulti.

Masculi pedicellati, et præsertim superiores fæmineis numerosiores, floribus fæmineis comitantibus multo magis *tardiores*.

Cal. 4-5 sepalus, sep. æstivatione valvata navicularia apice intro fracto triangularia trianguli basi elevata carnosa pilis uncinatis parcis pilosa, marcescentia, alabastra cyathiformia.

Stam. totidem his opposita æstivatione introflexa, demum elastica dessilientia. Filam. carnosa subulata antica rugosa et longitudinaliter striato-sulcata. Antheræ basi affixæ, biloculares longit. lateraliterque dehiscentes membranaceæ, loculis septo incompleto bilocellatis. Pollen album globosum læve. Rudiment fæmin centrale conicum.

Fæminei sessiles. Calyx herbaceus emarginatus sinu lato

compressus, postice convexus, antice centro alatus, hirtus. Ovarium unicum ovatum acuminatum, 1-loculare, ovulum 1, erectum foramen apicula. Stylus brevissimus. Stigma maximum, incrassatum, pilis cellulosis simplicibus hispidissimum, deciduum, fasc. vasor. unicum tenue.

Fructus calyce ampliato albo 3 rarius 4-alato inclusus, calyce postice convexiusculo, 4-sulcato, rarius hinc alato alæ utrinque 1-sulcato, emarginato, sinu angusto, antice medio alato, et corolla papilionacea now male referentem, glandulosus et hirtellis, ob obovatus, ater nitidus lævissimus stylo apiculatus.

Semen unicum erectum fructu conforme. Testa subcoriacea, e cellulis sinuosis conflata, tegument interius tenue membranaso-cellulosum albumen carnoso-farinaceum.

Embryo axilis rectus albus inversus. Radicula conica.

Cotyledones rotundatæ, faciebus latioribus seminis parallelæ. Plumula inconspicua.

Hab. Upper Assam. Suddyah: *July 6th*, 1836.

The ovula have two coats, the outer of which forms the tegument of the seed, the sinuosus cells are developed from above downwards, this always separates with the pericarp. The second integ. subsequently becomes united to the nucleus and finally disappears.

The albumen is developed within a very fine membrane formed with the cavity or excavation of the nucleus. It is in an early stage attached to the base of the nucleus. The embryo appears early.

This forms an exception to the statement of Schlechtendal, that opposite leaves are never disjointed, male flowers articulated on the apices of the pedicels. The pedicel being in one species persistent.

Char. gen. alabastra masc. cyathiformia. Sepalorum apices introfracti triangulares, basi elevata carnosa, cal. fæm. integer. evalvis emarginatus, frutus 3-alatus, alis lateralibus majoribus. Fructus stylo persistente apiculatus.

Vix differt a Bæhmeria.

Suffrutus, foliis caulinis oppositis, 3-veniis, stipulis interpetiolaribus, floralibus alternis. Flores in axillis aggregate utriusqne sexus mixto.

2. *Bahmeriæ* sp. Pl. DLXIII. Fig. I. Itinerary Notes, p. 216, *no.* 86.

1. Flos. mas.
2. Idem apertus.
3. Flos. fæmineis, cum ejus bracteis.
4. Idem apertus cum ovario aperto.
5. Fructus junior.
6. Ovulum.
7. Fructus maturatus.
8. Semen.
9. Ejus sectio longitudinalis.
10. Semen testa aperta. membrana interna peripheria embryonis cavitatem centro albuminis massam ostendens.
11. Embryo.

Folia carpellaria cum sepalis alternant. signum est oppositionem staminum sepalis minoris valoris esse signum est etiam that whatever the number of series of stamina may be, that the ovaria will rather have relations with its sepals than with the innermost series of stamina.

Morus.

Morus acidosus Gr.

Frutex ramosus virgatus 4-6 pedalis ramulis novellis brevibus folia fructiferis.

Fol. breviter petiolata indivisa vel bi-trilobata ovata, caudata, acutissima cum mucrona argute serrata, serraturis mucronatis interdum duplicatis teneriuscula, tactu retrorsu scabra, glabra, basi 3-venia, venis secondariis arcuatum nexis, primariis lateralibus externe tantum secondariferis intervenis quam maxima reticulatis, cauda integerrima.

Petioli sub ½ unciales, stipulæ cuducæ.

Gemmæ axillares, sæpissime ad latus pedunculor. semperque posticæ vel interiores quoad ramum fulcientem.

Fructus; axillaris in pedunculis, subnutantibus, linearibus pubescentibus, oblongis aggregatis rubris, sapore mori albæ sed multo magis acidiora, lobato-rugosa, stylis stigmatibusque persistentibus quasi echinata.

Calyx fructus carnosus, sepala 4, cucullata, carnosa colorata.

Pericarpium liberum ovatum, verticaliter compressum stylo stigmatisbusque persistentibus his sphacelatis terminatum, obliquum, tenuiter baccatum.

Semen unicum ovatum compressum, pendulum pericarp. adhærens. Testa ossea fragila.

Tegument. interius albumen includens tenue membranacea, albumen copiosum, carnosum album.

Embryo curvatus, vix axillis periphericus, approximatus albus.

Radicula longa, supera, teres, cotyledones subæquans.

Cotyledones cordatæ foliaceæ planæ, faciebus angustis seminis oppositæ quoad axi plantæ incumbentes.

Plumula inconspicua.

Micropyle inconspicua hilum prope.

HAB. Cheikwar in sylvis, communis est: *April 8th*, 1836.

FICUS.

1. *Ficus sideroxylifolius*, Gr. Pl. DLI Fig. 2.

Arbuscula cortice grisea fol. spathulato-obovatis ascendent. medium supra patentibus coriaceis subtus subferrugineis fructibus axillar. binis (pedicell. petiolis paullo excedent) obpyriformi turbinatis.

HAB. Malacca, Tanjong cling in arenis vel terrest. vel Epiphytic.

2. *Ficus indica.*

Arbor vasta indefinite extendens ope supports e ramis omnibus primarii emissis. Corona densa formosa, 100 pe-

dalis. Rami inferni horizontali extendentes, superiores oblique a decendentes.

Ramuli crassi compressi. Petiolis biuncialis, complanatis, obsolete canaliculatis.

Folia elliptico-oblonga, breviter obtusque cuspidata subrepanda integerrime glabra, coriacea, basi subtrivenia, venis secondariis arcuatim nexis, interstitiis reticulatis, plerumque vena additoria central. reticulationes inferne parvæ.

Gemmæ, conico, subulatæ, 1½ uncialis, squamæ velutinæ. Vernatio involuto-convoluto.

Hab. Bengal, near villages.

Obs. The glory of the genus as well of the Indian Sylva. There is absolutely no limit to this tree, which may either continue simple, or by the destruction of the part of the branches between the support and the trunk, it may become subdivided.

Roxburgh calls the leaves ovato-cordate : is this, therefore, his plant ?

3. *Ficus glabrus.*

Arbor magna, trunco parum sculpto, ramis patentissimis vel ascendentibus, e radiculosis.

Internodiis abbreviatis. Petiolis subcomplanatis.

Foliis alternis oblongo, ovatis integris coriaceis, apice rotundato obtuso, glabris lævibus.

Venis secondariis distinctis lutescentibus arcuatim nexis, interstitis reticulatis venis additoriis plerumque interjectis reticulatione inferne minima.

Stipulis, uncialibus conico subulatis.

Fructibus axillaribus sessilibus, binis, aurantiaces lævissimis, oblongo-rotundatis, umbilico minimo.

Hab. Assam, Gowahatti in silvis.

4. *Ficus obovatus,* Pl. DII. Fig. I.

Arbor. Rami annulati ramuliqui angulati.
Petioli breves supra canaliculati et complanati.

Gemmæ conico subulatæ $\frac{3}{4}$ unciales.

Fol. obovata obtusa integerrima coriacea, venis additoriis secondariis subæqualib. intro marginalibus distinctis, reticulatii inferne minimis, stomatosa portios reticulas excedens.

Fructus sæpius binati aliquando abortionem solitarii, sessiles in axillis subgloboso apice depressa, umbilico squamis imbricatis 3, summis cum calyculicinis squamis alternant. internis introflexis, basi calyce triphyllo imbricato cincto, saperficie verrucosula.

Calyx initio receptaculum omnino obtegens.

Habitus arboris Artocarpa integrifolia, quoad gemmæ floriferæ et foliatione accedit Guttiferis quibusdam.

Obs. The consideration of the scales seen in such various situations on the parts of fructification of Ficus, would lead us to suppose, that the receptacle is formed from the cohesion of a vast quantity of bractes. In the usual acceptation; the bractes must be supposed to be latent, otherwise the flowers will bear no relation to the usual parts. In this species in the earlier stages the bractes exceed in bulk the size of the receptacle and this in still earlier stages does not, I dare say, exist. The matter will be at once set at rest if any species are found the flowers of which have a determinate relation to the bractes or scales.

Hab. Assam.

5. *Ficus elastica*, Pl. DLII.

An immense tree, with the trunk richly sculptured, and supports thrown out from the bases only of the principal branches, which spread out horizontally.

The young branches are angular, the scars of the leaf buds which are terminal, are very oblique, scales, stipulæ of anthers, large membranaceous, colored.

In young specimens the foot stalks are flattened, and furrowed above.

Leaves elliptical or ellipto-oblong cuspidate, acumina very

entire, very smooth coriaceous, midrib large whitish, other veins tolerably equal, parallel, the larger ones connected by a distinct intromarginal vein, towards which the parallel veins become evidently reticulate.

Flowers (young fruit) compound axillary sessile in pairs, surrounded at the base by a fleshy cup, closed at the apex.

6. *Ficus affinior* Pl. DLIII.

Arbor crescentia et habitu omnino Fici affinis.

Petiol $2\frac{1}{2}$ uncialis basi incrassato supra canaliculata.

Fol tremule alterna ovulo-oblonga vel subelliptica plus minus repandum subito cuspidato acuminata, coriacea utrinque glabra venatio Peepuli, reticulationes inferne minutissimæ. Gemmæ brevissimæ conicæ.

Fructus in spicas nudis densuisculis disposit sessiles.

Fructus; bini sessiles in axilis, sæpe ob foliorum dejectu spicati, globoso-turbinati, punctis sublcavatis lutescentibus notat. basi calyculo tridentato cincte. Umbilico clausa, squamis extimis ternis.

This description refers to the real *jooree* or Ficus affinis of Gowahatti.

The growth is exactly that of Peepul and Jooree it is a lac tree; it differs from Peepul in the shape of the leaves and want of tail, from Jooree in the coriaceous nature of the leaves, their shape and sudden cuspis.

The habit is similar to that of the Peepul, for which the tree may easily be mistaken, the shape and chartacious nature of the leaves are however obvious distinctions.

This tree has the same growth and sculptured stems, the net work its roots form is often extraordinary; and in one instance I have seen a large tree entirely surrounded with a flattened-out root. Such trees always soon die: attempts are sometimes made to throw down a continuation of the woody and cortical growth.

7. Ficus peepul.

Arborea, trunco composito, interdum puro reticulato, cortice alba glabra.

Ramuli teretiusculi, gemmæ semuncialis subulatæ.

Folia longe petiolata, petioli teretiusculi apicem versus canaliculati basi interdum sub $\frac{1}{2}$ torti.

Fol. deltoidea, longe cuspidato-acuminata, fere caudata, lateribus basi rotundata undulata chartacea basi sub 5-venia venis secondariis distinctis et distincti arcuatum nexis secondariis 4, infimis externe ramosis, minute reticulata subtus.

Fructus in ramulis foliis expers, bini et sessiles in axillis, approximat. ita ut spicum mentiunt. turbinato-globosa sunt verrucioles albis, viridibus cæterum glabris, basi calyculo ternato inconspicuo.

Umbilicus omnino clausus sequamis tribus externis alternantibus cum calyculo, interioribus plurimis introflexis.

Hab. Assam. Tezpoor.

The trunk varies much : generally several and all united, and really arborescent, occasionally clasping large trees, when are then reticulate.

8. *Ficus* sp. Pl. DXLIX. Itinerary Notes, p. 111, *no* 145.
Hab. Bootan.

9. *Ficus teminaloides*, Pl. DL. Itinerary Notes, p. 101, *no*. 33.

Hab. Bootan.

10. *Ficus* sp. Pl. DLXI. Fig. I. Itinerary Notes, p. 166, *no*. 857.

1. Inflorescence contained in one axilla (in a young state.)
2. Ditto longitud. section.
3. Ditto Flower.
4. Inflorescence nearly matured.

4*a*. Vertical view, shewing the umbilicus.
5. Ditto longitud. section.
6. Subsessil fruit half matured.
6*a*. Stalked do.
7. Longitud. section of a fruit.

Hab. Bootan.

11. *Ficus papyrifera*, Gr. Pl. DLIV. Fig. 11.

Arbor mediocris, trunco albo parum sculpto, ramis nutantibus, novellis flexuosis.

Foliis alternis elliptices longe cuspidatis obtusis chartaceo. coriaceis integerrimis, venis secondariis tenussimis arcuatim nexis quam additorus vix magis conspicuis vena intromarginalis distincta.

Fructus axillaris, solitarius globosus, pallidus, pomi parvi magnitudinem, umbilico squamulis minutis clausa.

Stipulis, subulatis viridibus brevibus.

Cortex tenacissimus.

Hab. Assam. Gowahatti in sylvis collinis.

12. *Ficus pellucido-punctata*, Gr. Pl. DLIV. Fig. I.

Arbor robusta, breviuscula, corona densa, lata.

Ramuli compresso-angulati.

Petiol. semuncialis, profunde canaliculat. fol. obovata, vel sub ovata, obtuse cuspidato-acuminata integerrima, pellucido-punctata venis indistinctis, exceptis secondariis, reticulatione inferne magnis.

Fructus, rubescentis sessilis, binati, abortu solitaria subrotunda basi tribracteat. umbilico, semii aperto, cerasi parvi magnitud-glabr.

This has the usual epiphytical growth.

Hab. Assam Gowahatti in sylvis.

13. *Ficus aurantiaceus*, Gr. Pl. DLIV. Fig. II.

Ficus scandens radicans caulis compressis utrinque centro sulcatis, ramuli alternantes elongati, Gemmæ inconspicuæ subulatæ.

Foliis oblongo-ovatis brevi petiolatis obtusis integris vel obovatis basi attenuatis, coriaceis subtus pallidis subpilosis with conspicuous white often binary spots (stomata) tactu aspera verruculis plurimis albis petiolis pilosis.

Fruits (anthodium) axillaribus from a short knob-like branch solitary pendulous obovate subpedunculate (pedunculis about $\frac{1}{2}$ inch long) at the base of its stalk with 3 subcordate bracteate scales, and a mamillate umbilicus at the apex; at first the colour is orange, then deep blackish purple when it is deliquescent.

Flowers of both sexes long-stalked, stalks white. Anth. oblong, lilac or white and transparent. Stigma bipartite acute, style oblique seed pendulous oblong with a thick white margin especially at the micropyle. Inner tissue or membrane elastic, albumen sub. 0, radicle moderata.

Hab. On trees, Malacca, between Rhim and Ayer Punus.

14. *Ficus mangiferifolia*, Gr. Pl. DLV. Fig. I.

Arbuscula corona densa, habitu mangiferæ ramuli compressa.

Petioli 2-3$\frac{1}{2}$ unciales, graciles subcomplanato supra sulcata.

Folia lanceolato-oblonga, repanda, cuspidato-acuminata, acumina semi-torto, chartacea glabra venatio ordinaria reticulationes inferne minutissime areolis punctis pellucidis 2-3 distinctissimis, sublente.

Gemmæ ovatæ, squamæ coriaceæ brunneæ.

Hab. Assam. Beyllottah.

15. *Ficus intermedius*, Gr. Pl. DLVI. Fig. II.

Arbor magna.

Cortice ramorum cinerea. Ramuli petioli foliaque subtus scabrelli.

Petioli teretes supra lineali 1$\frac{1}{2}$ lineales. Gemmæ minimæ conico subulatæ petiolis breviores.

Fol. alterna oblonga vel obovato-oblonga basi sæpe inæqualia longe et obtuse cuspidata integra chartaceo-coriacea supra lævia glabraque interveniis subconvexis, venatio secondar. valde distincta arcuatim nexæ additoria subnullæ, tertiariæ grandes, direction sæpius transversæ reticulationes ultimæ minimæ.

Fructus pedunculat. sæpius (abortu) solitarii in axillis pedunculis petiolo paullo longiorib. basi pluri-squamati scabrohirti, uti superficies fructiis globosi, verrucis irregularibus ochroleucis, umbilico subaperto succus fere aquosus cortex tenax

16. *Ficus millingtonifolia*, Gr. Pl. DLVI. Fig. I.

Arbuscula.

Ramuli cinereo-ferruginei compressi.

Petioli concolores puberulæ complanati supra canaliculati semunciales.

Gemmæ subulatæ, acutæ. Folia interdum subopposita obintermod. abbreviationem brunneæ, puberulæ.

Fol. obovato-oblonga subrepanda cuspidato-acuminata subcaudata, integra chartaceæ utrinque glabra, supra sublucida, venatio ordinaria secondariæ subdistincti nexæ, intervenia harum supra clavata, reticulationes inferne majusculæ.

Obs. Ficus caudatæ affinis, sed distincta, verruculis nullis, petiolis complanatis, foliorum forma, et acumniatione, et glabratione, et habitu.

Hab. Assam. Beyttollah.

17. *Ficus caudata*, Pl. DLVII. Fig. I.

Scandens in arboribus ramuli verruculis uti petioli exasperat. subteretes.

Petioli compressi supra canaliculati semi torti.

Fol. oblonga magnitudinem varii, 2-4 uncialia vel etiam fere pedalia, integra, subtus tactu aspera, subito longeque cuspidato-caudata.

Venatio ordinaria, interveniis plerumque subullatis, basi subtrivenia reticulationes inferne minimæ.

Gemmæ breves bilineales brunneæ, uti petioli ramulique.

Hab. Assam. Gowahatti.

Distinct, especially on account of the compressed not flattened petioles.

18. *Ficus longipes*, Gr. Pl. DLIX. Fig. II.

Frutex scandens.

Ramuli compressi, folia ovata coriaceo-chartacea, integra subacuta, venatio-ordinaria, reticulation infra minima.

Gemmæ conicæ breves, 2 lineales.

Fructus, axillares, solitariæ abortu in pedunculis, uncialibus petiolos $\frac{1}{3}$ excedentibus apicem bracteatis, ovato-globosa, cerasi parvi magnitudine, umbilico annulo cincto, clauso, aurantiaceis, glabra, pedunculi infra incrassata ascendentes.

Cicatrix inflorescentiæ secundæ distincti in axillis.

Hab. Assam. Gowahatti.

19. *Ficus sclerocarpa*, Gr. Pl. DLVIII.

Arbor

Pubescente hirta. Ramuli robusti. Venation of the corolla perfect, monopetalous.

Petiolis rotundatis. Folia longe petiolata cordiformi-orbicularia breviter et obtuse cuspidata remote et inconspicue serrata, utrinque hirta basin 5-venia, subchartacea venæ secondariæ distinctæ minutæ margine attingentes, tertiariæ secondarii intermediarum arcuatæ, cæterum transverse varie reticulatæ.

Fructus : maximus diametro 3-4 unciali late turbinati longe pedunculati, hirto umbilico maximo, aperto ore squamato, dura inedules.

Pedunculo clavato apice squamigero.

Section different, but allied to Roxburgh's Ficus macrophylla.

Hab. Assam Gowahatti in Sylvis.

20. *Ficus bistipulatus*, Gr. Pl. DLIX. Fig. I.

Frutex erectus, 6-8 pedalis. Rami robusti, corpore ligneo parco, medulla ampla.

Fol. alternis, petiolis rubris, uncialibus supra lineato-canaliculatis, oblonga basi subcordata acuminato-cuspidata repanda, pubescente hirta supra tactu scabra, venatio ordinaria duobus infimis secondariis basi approximatis, ideoque, fol. trivenia, venis rubro-tinctis, vernatio conduplicata.

Stipulæ membranaceæ, stipulis urticeis similis duo persistentis.

Fructus: bini abortive solitarii in axillis, pedunculati, pedunculis petiolo 4-plo brevioribus, medium versus articulates ibidemque tribracteatis, turbinata rubra, punctis irregularibus albidis, umbilico annulo obsolito cinct.

Hab. Assam Tezpore sylvis squamis clauso.

This belongs to a very different section characterised by its large medulla, leaves hairy on both sides, with membranous distinct stipules, and terrestrial habit.

21. *Ficus oppositifolia*, Gr. Pl. DLX.

Frutex arbusculoideus robustus.

Ramuli teretes crassi medulla magna contracta fistulosa scabrida.

Folia opposita petiolis vix uncialibus, subteretibus oblongis basi cordatis novella brunneo-pubescent. obsolete dentatis cuspidato-acuminatis, tactu utrinque scaberrimis venis omnibus infere prominulis.

Gemmæ mediocres, conico-subulatæ, stipulæ membran. caducæ, discretæ binæ.

Fructus in racemis axiliaribus abreviatis, squamatis sæpius binatim aggregat. pedunculis 2-3 linealibus, globoso-turbinalis, subscabris interdum subcostata costis squamis circum. umbilicum respondentibus basi calyculo trisepalo cincti, apice squamato, squamis carnosis pluribus umbilicum claudentibus, an affinis F. laminosæ.

In aquosis ad margines sylvarum.

Hab. Assam, Gowahatti : *December*.

This species comes very near to Ficus laminosa, especially in the stipulation and shape of the leaves, it is the only one with opposite leaves yet known ; Jenkins tells me that Ficus carica has been grafted on it.

I consider this genus to prove absolutely that stipulæ are mere scales of buds, and that they are not necessarily double organs.

In this speceis if they are double organs, we must assume their coalescence, of which there is no trace.

The fruit of Ficus is entirely analogous to those Compositæ, whose receptacle is quite naked, the outer ones being involucra, and as it were carried up and closed over the receptacle.

22. *Ficus rubifolia*, Gr. Pl. DLVII. Fig. III.

Scandens radicansque hirsuta scabra.

Folia cordato-ovata indivisa vel tri quinque loba more Rubi vel Hederæ.

Squamæ persistentes duæ membranaceæ.

Fructus longe pedunculata ovato unceolato hirsuta apice depressa.

Pedunculi uncialis petiolas excedentes, apice bracteati.

F. heteroplyllæ accedens.

Hab. Assam Gowahatti.

23. *Ficus apocyneoideus*, Gr.

Frutex repens in arboribus caule, petiolis, foliisque subtus pubescent.

Petioli breves $\frac{1}{4}$ uncialis supra plani.

Folia opposita ! lanceolata, vel sæpius lanceolato-ovata obtuse acuminata, integra chartacea, supra glabra. Venatio ordinaria, secondariis distincti nexis stomatose portion in excess.

Ciliæ inter petiolares distinctæ.
Procul dubio igitur Apocynea vera.
Hab. Assam Tezpore in arboribus.

24. *Fici* sp. Pl. DLVII. Fig. II.
Hab. Bootan.

25. *Fici* sp. Pl. DLXI. Fig. II. Itinerary Notes, p. 137, *no.* 594.
Hab. Bootan.

Artocarpus.

1. *Artocarpus cuspidatus.*

Arbor.
Ramuli robusti ferrugineo-hirti, uti petioli: gemmæ, foliaque subtus ad venas.
Petioli teretes subunciales.
Fol. obovata vel sæpius obovato-oblonga, obtusissimo uno etiam sæpius emarginata, integra, minora interdum apice dentata coriacea, dura, scabra, v. 2 dariis obliquis rectiusculis, intra marginem arcuatum nexis v. ven. intromarginal. commun.
Fructus axillaris subsessilis, globosus irregulariter horizontalis, covered with innumerable scabrous long points from conical angular bases, from the irregular way in which these points are disposed, not all radiating from a common surface, the fruit would look outside as if it were composed of many concrete capituli.
When ripe if opened or torn across, it separates into a globose receptacle densely crinite; these crina are the styles of the abortive pericarpia, few of which are at all enlarged, still fewer seed-bearing. The rest is fleshy, while the concrete perianths each presents a channel occupied previously by the style, each perianth ends in the point before mentioned.
Fruitlets large, oblong with an apiculus, baccate of an agreeable subacid flavor, inner layer membranous and very thin, to this the pulpy tissue is attached.

Pericarp relatively small, oblong, whitish, with an obsolete longitudinal line along both faces, a chartaceous thickish white covering distinct from the membranous one to which the baccate part is attached, seed pendulous oblong brown with a ½ complete raphe, beautiful and palmately branched at the chalaza, the branches all converging over micropyle. Tegument 1, thin and membranous.

Albumen 0. Cotyledons fleshy plano-convex, radicle very short next the hilum.

Hab. Malacca Verupha Aloor Gagal of the Malays, *A. echinatus* Roxb. *Tampooni*.

2. *Artocarpus*, sp.

Arbor humilis, corona patento, ramulis petiolisque plumbeo-viridibus velutinis, stipulis ovatis, *parvis*, fol. oblongis basi oblique cordatis repandis breve acuminatis subintegra, supra glabris, subtus reticulatis scabrisque. Inflorescentia axillaris, spadicibus masculis ochroleucis, cellulosis, breve pedunculatis oblongis, fæm. vel segregat vel 2 confertis vel masculis mixtis, junioribus globosis, longius pedicillatis viridibus.

Spad. mascul, intus cellulosæ, mollis, indique floribus monandris tectis.

Per. 3-sepal. sepal. spathulato-concavis.

Anthera 1, rarissima 2, exserta bilocularis. Filam. subulato-conicum corpora conic. capit. peltato margine glanduloso ciliato florib. masculis immixtis.

Fæm. spadix papillosa squamis ciliatis, crebris interspersum.

Per. ovar. supra omnino confluent. massum continum carnos. formant. Stylus erumpet. Stigma longe exsert. simplex, Ov. libera 1-locular. 1-ovulat. ovulo pendulo a latere apices loculi, foram. conspicui superum hilum prope.

Fructus immaturus parvus verrucosus ovar. plurima abortienti.

Succus lacteus præsertim spad. fæm. masculi folior. ramulorumque, aquo lacteus.

Hab. Mergue : *Feb.* 1835.

Fol. juniora livida.

3. ***Artocarpus integrifolia.***

Arbor altiuscula, demissius ramosa.

Ramulis cicatricibus stipularum notatis viridescent. verrucis castaneis crebris. Fol. petiolata obovata integra coriacea, penninervia supra lucida glabra infra reticulata pallida, tactuque scabra. Stipulæ diphyllæ, fol. oblonga membranacea albido-brunnesc. apicibus convoluto-concavis spadicis foliaque juniora involvent, deciduæ.

Spadicis utriusque sexus conformes.

Mas. oblongo-ovata basi involucra rudimentar. pluridentato stipat. superficio elevationibus frequentissimis et papilloso-crystillina undique floribus masculis tectæ.

Per. tubulos. pubescens apicem plus minus bifidum.

Filam. columnuve exserti crassum. Anthera bilocularis longitud. lateraliterque dehiscent. Pollen læve. Spadix masculis fere exsuccus, fæm. succo lacteo plena, extus muricatisimus.

Per. cylindraceum ad medium inter se coalit. bases versus tubuloso, apices angulatæ carnosæ subsolidæ, stylo tantum perforat.

Stylus obliquis filoformis, Stigmata simplex. Ov. 1-loculare 1-ovulat. ovula pendulo a basin styli foramen ad apicem ovuli conspecui.

Culta circa Mergue frequentiss : Floret Dec. Jan. Per 2-3 phyllum. Stam. longitudinæ perianthii Descriptio fructus obscur.

Dorstenia.

Dorstenia sp.

Frutex humilis, ramulis angulatis petiolisque pedunculisque breve et fusco-pubescent. fol. breve petiolata cuneato-obovata cuspidata coriacea, integra marginibus cartilagineis, subtus ad nervos tactuque scabris, stipulis setaceis pubescent. Inflorescentia capitata, capitulis longiusculi-pedunculatis axillaribus patentibus solitariis. Peduncula tortilo, floribus inconspicuis albis.

Involucrum sub 4-partit. foliolis patentibus subacuminatis. Receptaculum carnosum superficien albido pubescente, flores omnino recond.

Flores Mas. Per. 0, nisi receptaculi excavationes.

Stam. 2, libera per superficien demum erumpent, filam. filiforme papillis cabrella. Anth. biloculares, membranaceæ, longitud. dehiscent. Pollen læve angulorum, flores pericrices primas dehiscent.

Capitulis declinus form. duplo longius pedunculatis, pendulis apices versus majus incrassatis.

Involcr. 5-6 partit. laciniis angustioribus, primo in super receptata conniventib.

Receptacula ut in marib. stylus subulatis stigmatibusque simplicibus perforat. Perforatio pilis albis cincta.

Ovar. in substantia receptac. recondit. nidulansque.

Stylus obliquus, 1-spermo, ovula pendula ab apice foramen infera.

Fructus compositus difformis, involuc. laciniis recurvis, tactu mollis, ovaria plura alba Coryli magnitudinem parietibus carnosis.

Semen pendulum, ovario conforme, testa celluloso membranacea hilum versus incrassata, et brunneo-lutescens. Albumen 0. Cotyledones crassæ, carnosæ, plano-convexæ.

Radicula infera brevissima obtussim. Plumula subconspicue. Cotyledones saporis dulcis vix lactescens, fructu inciso tantum excepto.

Hab. Mergue. In sylvis. Ins. Madamacca: *January*, 1835.

An receptaculi flores recondiens vel perianthia capitato unius omnino accreta.

Omnia Dorsteniæ, habitu stigmateque simplici exceptis: an stigma vere simplex.

Urticæ sp. Pl. DLXII. Fig. III.

Hab. Tongsa Bootan.

Batis spinosa. Pl. DLXII. Fig. I.

HENSLOVIACEÆ.

Henslovia.

Cal. 5 fissus, laciniis ovatis acutis. Pet. 0. Stam. 5 laciniis calycinis alternis. Filam. brevia incurva. Anth. biloculares, (connectivo magno) longitudinaliter dehiscentes. Ovarium biloculare loculis polyovulatis. Stylus filiformis. Stigma capitatum papillosum.

Arbores foliis oppositis ramulis abrupti desinentibus, floribus racemosis inconspicuis. Ordo naturalis ignotus.

Habitus Jasminearum R. Br. Duæ species notæ, H. pubescens quam delineavi in opere Wallichiano et H. glabra.

Henslovia pubescens Pl. DLXIV. Fig. II.

Arbor elegans.

Ramis determinato-ramosis, ramulis compressis sub 4-gonis, glabris, fol. oppositis breve petiolatis ovatis obtusis vel obtuse acuminatis repandis integris supra lucidis glaberrimis subtus pallidis penninervus.

Inflorescentia terminali-composita, paniculis nempe racemosis ad apices ramorum sæpius nudorum confertis.

Racemis oppositis sæpius deorsum flexis (pedunculo communi erecto,) cylindricis, subplumosis, multifloris, floribus dioicis parvis læte viridescentibus odore ingrato.

Bractea lanceolata primo viridia cito sphacelata ad basin cujusque racemi.

Pedunculis, pedicellis calycibusque extus pubescentibus.

Per. basin latum subcyathiforme, 5-fidum, laciniis late ovatis acuminatis, æstivatione valvatis intus ad basin pub-se cens, pilosumque. Pilis albis in cristis 10 dispositis, cristis alternis ad filam. bases laciniarum currentibus. Pet. 0.

Stam. 5 perigyna, sinubus perianth. paululum infra inserti, libera. Filam. æstivatione inflexa, filiformia, Connectivum carnosum. Anth. biloculares, basibus affixis, bilocul. loculis linearibus marginalibus longit. lateraliterque dehiscent. Pollen lanceolato-ovata læve hinc sulcatum. Rud. ovarium centrale bilocul. ovulorum rudiment. plura, minima, Stylus 0. Stigma capitatum.

Æstivatio perianth primo valvato sed cito aperto fit.

1. Bud.
2. Do. more advanced.
3. Flower.
4. Do. vertical view. Filament cut across above exsertion, shews the hairs of the perianth running in lines to the stamens and sepals.
5. Anther front view.
6. Do. extrorse.
7. Do. burst.
8. Pollen.
9. Long section of the perianth and ovarium, rudiment glanduloso-pubescens.

Fructus Pl. DLXII. Fig. III, bilocularis capsularis latoovatus velutinus basi calyce filamentisque persistentibus stipitat. apice bivalvis, valvis splitting along the style, but remaining attached by the stigma! valvis medio septiferis. Semina 00, plura abortientia, transversim, placentis affixa, ovata. Testa brunnea reticulata, dorso cristata, crista in apicula producta. Tegument. interius membranac. tenuissimum. Albumen 0. Embryo cellulosum orthotropus. Cotyledones parvæ, plano-convexiusculæ.

Radicula clavata obtusissima hilum spectans. Plumulo in-

conspic. Chalaza parva. Raphe cristiformis fibrosa, ultra apicem producta.

a. Capsule.

b. Capsule opened throughout.

c. Embryo.

d. Embryo, cotyledon removed.

e. Seed long section.

f. Seed, *g*. ditto dorsum.

Foliatio Oleacearum (Br.). Inflorescentio Combretaceaarum cui etiam accedit. Staminibus æstivatione inflexis. Antheræ Euphorbiaceæ.

Hab. Mergue in sylvis : *Nov*. 1834.

2. *Hensloviæ*, sp. Pl. DLXIV. Fig I.

Descr. Arbor magna ; ramis teretibus griseis, nodis incrassatis ; ramulis brunnescentibus abruptis, brevibus et sæpius ut videtur diphyllis.

Folia breve petiolata, oblonga, basi cordata, coriacea sæpius leviter conduplicata obtusa, long. sub. 4-unc. lat. 2-unc. ven secondariis arcuatim nexæ, interveniis reticulatis, reticulatio superne valde distincta et depressa, subtus pallide virides-cente margine cartilaginea recurva.

Petioli subbilineati crassi, transverse rugosi.

Racemi in paniculum brevem dispositi ortam ex axili. fol. laps. oppositi, sæpe 5 paniculæ unius, (aliquando paniculæ 2-3 fasciculatæ) spithamææ vel pedales, pendulæ vel nutantes brunneo-puberuli.

Pedicelli subclavati, per breves basi bractea minutissime pedicello duplo breviore suffult.

Flores numerosi, rubescentes, subglobosi extus brunneo-puberuli, alabastra conica e basi hæmisphærica.

Cal. ad medium 5-partitus ; laciniis conniventibus triangulari, ambitu acutis, æstiv. valvat. tubus intus albidus (sublente punctulat.) sub parce pubesc. as if lined by the staminal tissue. Cor. 0.

Stam, 5, fauci inter sinus inserti, filamenta alba apice caruea, æstivat. introflexo-arcuata.

Connectivum pallide roseum, longit. sulcatum, as though the filam were of two combined. Anthera citius an unquam erectæ, didyma, vel reniformis: loculi brunneo-purpurei angusti. Pollen album.

Ovarium subhæmisphæricum, conicum pubescenti-pilosum; triloculare! basi lata affixum, nullo modo inferum.

Stylus robustus filiformis demum staminibus paullo brevior, trisulcatus, viridis, medio plumbeo tinct; *præcociter exsertus*.

Stigma truncatum, subtrigonum obtuse pervium.

Ovula 60, placentis axilibus carnosis affixa anatropa, sessilia, erecta vel ascendentia.

Hab. Malacca.

Obs. I see no reason why this genus should not range in or near Lythrariæ, in which apetalous forms are not uncommon, and which indeed is pointed out by the frequent minuteness of the petals, and the coloration of the calyx. The situation of the stamens may be an objection, but this is perhaps explainable. The structure of the seeds is the same, and altogether the sum of the characters is Lythrareous.

SCEPACEÆ.

Scepacea.

Ramuli teretes albidi novelli subangulati.

Folia alterna, stipulæ deciduæ, petiolus sub 4-linealis utrinque incrassatus, lamina dependens ut plurimum leviter conduplicata oblonga vel sublanceolata mucranato-cuspidata integra, long. 4-4 ½ unc. lat. 1-7 lin. carnoso-subcoriacea, venis secondariis arcuatim nexis, interveniis reticulatis, the reticulation is most evident underneath.

Spicæ axillares subbiunciales, pubescentes in pedunculum abbreviatum insert. ideoque racemosæ, racemis interdum plus quam 1. Bracteæ lanceolatæ brunneo-puberulæ subbinæ ad basin spicæ cujusque, initio imbricatæ. Bracteola pallidiora velutina minuta sub florem quemque concava.

Flores minuti undique insert. Sepala bracteolis similia, sub 4, minuta pubescentia, leviter imbricata.

Stam 4, sepalis opposita; hypog. filam subulata alba sepalis sub 3-plo longiora stricta: Antheræ didymæ erectæ, longit. dehiscentes lunulato reniformes extrorsæ.

Glandulæ 4, crassa angulati-sublobata, sepalorum longitudine inter positæ filamentes.

Rudimentum Pistilli centrali-capitatum, sepala paullo superans.

The stamina are generally 4, but sometimes not unfrquently 5.

Situation and alternation of parts, Pl. DLXV, *g*. Fig. IV. *h*. glands.

Hab. Malacca: *January* 24th, 1845. .

ANACARDIACEÆ.

Anacardium occidentalis. Pl. DLXV. Fig. III. *e. f.*

Cal. irregulariter 5-sepalus, sepalis æstivatione imbricatis. Pet 5, lineari-acuminata, staminum annuli basin inserta, medium supra reflexa, æstivatione imbricata velutina.

Stam. 10 hypogyna inæqualia postico majore exserto. Filamenta filiformia basin versus in cupulam ovarii basin cingentem coalita, apicibus nigrescentib. constrictis. Anth. medium versus affixæ, biloculares, longit. lateraliterque dehiscent. Stylus subulatus longe exsertus. Stigma subcapitatum.

Ovarium superum 1-loculare, 1-ovulatum, ovulo subreniforme, transverse situm, funiculo laterale (nec centrale) sustento, foramen hilum prope.

Pollen ovatum læve hinc sulcatum lividum. f. ovarium and ovule in situ from a bud. e. ovule separated.

HAB. Mergue: *Nov.* 1834.

MELANORRHÆA.

Melanorrhææ sp.

Arbor excelsa florifero formosa, fol. ad apicem ramulor. confertis, oblongo-obovatis integris coriaceis reticulatis. Paniculis terminalibus axillaribusque, thyrsoideis, floribus numerosis albis odoratis.

Cal. calyptræformis, integer. basi ad anthesin circumscissa calyptratimque decidua reticulato-venulosis pubescens.

Pet. 5, hypogyna patenta, lineari-lanceolata post anthesin ampliatissime, utriculataque et foliacea. Torus staminiferis incrassatis, subglobosusque. Stam. 00, libera.

Filam. subcapillaria ad medium usque parce pilosa. Anth. subversatiles biloculares.

Gynophorus ultra stamin. basin longe productus, post anthesin etiam productior ovar. ad apicem ejus.

Stylus brevis subulatus, subobliquus, quoad exsertio, nempe non omnino apiculis. Directione obliqua. Stigma capitat.

Ovar. 1-loculare, 1-ovulatum. Ovulum funiculo brevi lateraliter ad basin loculi affixum, foram. hili prope.

HAB. Mergue. In sylvis, Ins. Madamaca. *Dec.* 1834.

SYNDESMIS.

1. *Syndesmis coarctatus*, Pl. DLXVII. Fig. I.

Fructus; cernuo-penduli cymosi, cymis pseudo-lateralibus, et oppositifoliis, pedicellis robustis clavatis subfastigiatis exsuccis, basi annulo elevato undulato utrinque caulescenti, et annulum verticale completi efformant. annulo verticali simplice, latere uno ventrale magis evoluto, at the outer base throwing out irregular ridges.

Epicarp. coriaceum, papilloso-verrucosum. Mesocarp. spongioso-fibrosum album. Endocarpium chartaceum, semini adhærens.

Semen erectum, tegumento vix vere solubil. when the seed is separated it appears extremely veiny, the veins arising from a short 4th complete raphe, and nearly meeting on the opposite side of the seed.

Albumen 0.

Embryo maximus. Cotyledones inæquales carnosæ subhæmisphæricæ, applied faces intus rosaceo-tinctæ.

Radicula brevis, slighty curved on the commissure of the cotyledons. Radicular face of the cotyledons with a smooth rather flat difform surface.

Plumula conspicua corresponding nearly in direction with the radicle.

Succus cito nigrescit.

a, c, h. Radicle.

b, d, i. Plumula.

g. Inner view of fruit or endocarp.

f. Spongy fibrous mesocarp.

e. Epicap.

Hab. Malacca.

The inequality of the cotyledones, appears general, as also the curious difference in the surface, and the waved irregular line marking off the two.

The vascularity of the tegument is perhaps at the maximum.

2. *Syndesmis* sp.

Arbuscula, ramis albidis, fol. lanceolato-oblongis, breviter petiolatis ad apices ramorum confertis, coriaceis subintegris obtuse acuminatis glabris, penninerviis.

Paniculis cymosis terminalibus solitariis vel sæpius 2-3 confertis, pedunculis præsertim secondariis compressis viridescentibus.

Bracteis membranaceis deciduis, ovatis, floribus numerosis, suaviter odoratis, albis, calyce miniato.

Cal. tubo subcylindrico edentato ? hinc ad anthesin longitudinaliter fissa, sub 3-fidoque.

Pet. subæqualia lineari-spathulata calyce fere 2-plo longiora, apicibus revolutis, hypogyna, a mediis infra tubo stamineo ? adnata, æstivatione imbricato.

Stam 3 usque ad medium in tubo gynophoro adnato coalito, tubo petalis cohærente exserta. Filam. libera facta petalis alternantia subæqualia filiformia. Anth. erectæ basibus affixæ biloculares longit. dehiscent. Pollen ovatum læve hinc sulcat.

Stylus lateralis, filiformis staminibus longior. Stigma subcapitatum 1-sulcatum, subbifidumve.

Ovarium longe stipulat. centraliter inter filament. situm, ovato-globosum, 1-loculare, 1-ovulatum, ovulo ascendente funiculo sublaterali brevi sustento, foramen ad hilum ad fundum loculi spectans.

Hab. In sylvis, Mergue : *no.* 675. *Nov.* 1334.

Pet. interdum 5. Stam. semper 4. Pet. distincto tubo staminео adnata, fol. impunctata genital. interdum abortientia floribusque, igitur polygamus ; eresinosa.

Anacardiaceæ cui habitu et structura ovaria ovulique omnino accedit, discrepat mere gradu ; petalis tubo staminео adnatis, stam. in tubum longe coalitis mediante gynophor. ovario stipitato et præcipue styli insertione obliqua.

Affinis est Terebinthaceæ, Mangiferæ habitu. Astropetalum sp. 1. meo sensu auctores pessime descrip. vide presertim, *no.* 645, cui petala stamina perigyna et ovarium in toro elevato insidens.

Astropetalum.

1. *Astropetali* sp. DLXV. Fig. II. *b, c, d.*

Arbor alta, foliis alternis exstipulatis long. insculp. petiolatis, apices ramorum versus confertis, lineari-lanceolatis coriaceis acuminatis repandis penninerviis marginibus cartilagineis irregulariter pellucide punctatis.

Paniculis patentibus, axillaribus, terminalibusque sulcatis, subangulatis, ramulis divaricatis cymosis. Bractea minute fere obsoleta ad basin ramulis cujusque, floribus parvis viridiscento-albidis, suaviter odoratis.

Cal. tubo brevi 5-fidus laciniis rotundatis breve ciliatis, æstivatione imbricatis.

Cor. 5-petala, petalis hypogynis oblongis, patentibus, subreflexis, sepalis alternantib. æstivatione imbricatis.

Stam. 5 libera, phypogyna etalis alternantia, filament subulatis petalis brevioribus basi incrassatis. Anth. oblongo-lineares subversatiles biloculares longit. lateraliterque dehiscentes. Pollen oblongum læve hinc sulcatum.

Glandulæ 5 minutissima staminibus alternantia.

Stylus filiformis crassiusculis stigma peltata capitulum 4-sulcatum ovarium superum 1-loculare, 1-ovula ovula funiculato ascendente foramen hilum prope.

Stam. Pet. vere hypogyna, toro nempe elevato cum ovario insidentia.

Torus calycis tubum æquans subpolygama, floribus plurimis rudimento ovarium tantum.

Fructus nondum visus, Habitus mangiferæ.

In Colla alleore. *no.* 645, *Nov.* 1834.

Hab. Mergue. Conspicua obamssas florescentæ densas, contuse adorem resinosum piperaceum effundit.

2. ***Astropetalum*** sp.

Arbor excelsa, fol. sæpius alternis ad apices ramorum confertis, petiolatis oblongo-lanceolatis, obtuse acuminatis integris subrepandis marginibus cartilagineis, nervis secondariis distinctis, nervo primario angulum valde obtusum formantibus.

Paniculis terminalibus foliosis patentissimis multifloris, floribus pallide lutescent. subodoris, obmassas longe conspicuis.

Cal. tubo brevi, limbo 5-fido, laciniis rotundatis æstivatione imbricatis.

Cor. 5-petala, petalis hypogynis, lineari-lanceolatis reflexis

unguiculatis unguibus gynophora adnatis. Petalis post anthesin ampliatis foliaceisque! ! !

Stam. 5 hypogyna basibus versus alatis et gynophoro adnatus petalis alternant. Parte adnate quasi sphacelato Filam. libera subulata basi dilatata petalis breviora. Anth. biloculares longit. debiscentes bases versus affixæ, introrsæ Pollen oblongum ellipticum læve albidum. Stylus brevis filiformis subobliquis, nec vere apiculis. Stigma capitat. medio foveolat.

Ovarium gynophoro insidens ovatum 1-loculare, 1-ovulatum. Ovulo vere pendulo, lateraliter et supra basin loculi inserta, funiculo brevi tenui sustentum. Foramen hilum prope loculi fundum aspiciens.

De perigyne si stamina hujus ordinis auctores pessime judica verunt. In omnibus generibus, quæ examinatione subjeci, stamina evidentis et omni sensu hypogyne. Hoc genus intermedium est cum Syndesmis (sp. 2.) *no.* 675, cujus gynophorus longius stipitatus et stylus omnino obliquus.

Buchanania.

Buchanania subobovata.

Foliis subobovatis, paniculis folia excedentibus albis, floribus 4-5-meris, stam. basi effætis.

Rami teretiusculi, ramuli virides.

Folia alterna apices internodiorum vel ramulorum subconferta, exstipulata, petioli basi incrassati, subuncialis, lamina subobovata, long. 4-5 unciali, lat. 1½ fere 2 unc. coriacea concaviuscula obtusa interdum emarginata, margine maturiorum sæpe undulato-crenata, v. secundariæ arcuatim obliquæ convexæ, v. aliis anastomosant. paullo minoribus, subtus venatio depressa et minus conspicua. *Vernatio conduplicata.*

Paniculæ axillares, foliis longiores obfolia conferta quasi thyrsum terminalem formant.

Pedunculi subspithamæi albi compressi rami secondarii

curvatim ascendentes an semper ultimæ cymoideæ vel racemosæ paucifloræ.

Flores minuti albi 4, sæpius 5-meri, odore ingrato, pedicelli breves clavati. Sepala 4-5, semi-ovata unico extimo minuta. Petala æstiv. imbricata totidem alternant. oblonga, patente reflexa obtusa.

Stamina petalorum numero dupla petalis $\frac{1}{3}$ breviora hypogyna subæqualia, filamenta alba subulata. Antheræ erectæ longitud. filamentorum magnæ, obtuse sagittatæ, pars sagittati alba effæta! Pollen aureum.

Cupula carnosa alba denticulat inter stamina et pistillum, hoc ex dimidia parti obtegens. Ovarium stipitem crassum brevem terminans subovatum. Styli 4-5 parce pilosi, stigmate totidem subcapitata.

Potius ovaria 4-5 petalis opposita, parce pilosa 1 tantum fertile, sterilia interne sulcata, in stylos crassos, stigmata capitato-terminalis attenuata: fertile ovatum 1-loculare, ovulum 1, terebinthacea, nempe pendulum e funiculo basi loculi affixo, foramen inferne spectans, stylus crassior brevior, stigma subsimplex.

It is remarkable, that the stigmata of the barren ovaria are alone developed, and alone shew the usual browning of fecundation! Can therefore be any communication between these ovaria and the ovuliferous one.

Mangifera.

1. *Mangifera lagenifera*, Gr. Pl. DLXVII. Fig. III.

Fruit gourd-shaped, smooth glaucescent discharging when wounded a black varnish, smell fetid, fleshy, entirely traversed by innumerable fibres, besides which it looks just as if it were minutely veiny reticulated.

The inner fibres are as thick as twine, and cutting through them is like cutting through twine.

Drupe entirely covered with innumerable fibres, lanceolate, ovate subæqualiter fibro-leathery.

Tegmen of seed separates with it, this on one side is black, thickish and coriaceous and sticks to the seed, but still is separable, on the other side it is fine membrano-chartaceous.

Seed erect, oblong lanceolate; one side, *i. e.* that to which the black part of the tegument adheres, presents an irregular surface, the other is smooth and traversed by the straight commissure of the cotyledones, the other is traversed by an irregular commissure.

Radicle stout short, a little above the base, each cotyledon is oblique at the base, and each has half the surface wrinkled, and half smooth.

In this, one cotyledon is longer than the other.

a. Auricle, white, *b* radicle; *c* root. *f* smooth, the other marks denoting rough.

Hab. Malacca. This is a pentandrous Mango-flowered large tree, with a round crown, high trunk, branched above, and spathulate obovete leaves. The Malay name is *Langoot*.

It is equally well distinguished by its lageniform fruit, by the rugose smooth cotyledones, calyx auricled outside below the radicle.

In the following (Beenjai) the auricle is confined to the larger cotyledon.

2. *Mangifera cæsia*, jack.

Arbor excelsa, habitu foliatione quodammodo magnoliacearum quarumdam.

Fol. cuneato-obovata, summa ad apices ramulor. conferta conduplicato-oblonga base attenuata acuminata apice rotundata coriacea venis 2-dariis distinctis.

Paniculæ thyrsoideæ, amplissimæ terminalis ramulis ultimis cymoso-umbellatæ. Flores polygami.

Masc. Sepal 5, 2 interioribus longioribus. Petala totidem erecta, apice patenti-reflexa (ideoque corolla videtur hypocraterif. tubo elongato) lineari-spathulata a medio infra carnosis et conspicue carinatis intus.

Stamen 1, sanguineum, petalis longioris, primo aspectu, stylum mentiens. Anth. minute terminalis, bilocul.

Stylus brevissimus sanguineus. Stigma terminalis discoidea ovar. rudiment. ad sunt staminodia circa fæm. rudim.

Fæm. Cal. corolla maris, but the coalition of petals with the torus or stalk of the ovary is much more evident. Stam. 2-3 abortive uno multo majore.

Ovar. obovatum apicem paullulum obliquum, stylo subulato petalorum longitudine. Stigma capitat. subreniforme.

Ovulum 1, anatropum appensum foramine fundum loculi spectans.

This is a stately magnificent tree, panicles exceedingly elegant cream colored. Petals white outside, inside except the margin, beautiful lilac.

The male flowers are much more numerous than female, the latter when present are terminal on each cyme. This is a very distinct species, and does away, in some measure with one of the pecularities of Syndesmis, and is at once distinguished by the cohesion of the base of the petals and the elongated torus, as well as by the long erect gamopetalous looking petals.

Hab. Malacca. It has the habit of Mangiferæ polycarpa, Malay name *Beenjai.*

3. *Mangifera polycarpa*, Gr. or russet fruited mango Pl. DLXVII. Fig. II.

Branches stout, confertly leaved at the apex. Buds protected by numerous brownish scales. Leaves, nearly a foot long tapering into a short stout flattened petiole, cuneate obovate undulate, more or less coriaceous, entire, obtuse.

Secondary veins, very distinct, well arched, not confluent, interveniis reticulatis, above dark green, below pale.

A large tree much like the Beenjai, both are among the handsome Forest trees, with a fine trunk, massive branches and a flattish thin crown, putting me in mind (from the branches) of Magnolias.

The specimen from which this last description is derived was a young tree. The differences in the leaves between this and the Beenjai are in the smaller size more obovate form. I have not seen the flowers of this, or the fruit of Beenjai.

Fructus oblongus basi paullo majora, sublobulata, hinc infra apicem depressus, brunneus, dusky all over, of a strong dorian or mango smell, not altogether unpleasant, with very acid and pleasant taste.

Flesh and juice especially copious, fibres very abundant.

Drupe outline lanceolate, rather compressed, it is not even woody, but coriaceo-fibrous, seed erect.

Integument separating with the drupe, of chesnut brown or black colour.

Embryo erect obclavate radicle on one side above the base.

On one side is a straight furrowed line, on the other an oblique irregular waved one, these are the edges of the cotyledons, which are very unequal, it is the larger one which is produced downwards, so as to make the radicle oblique.

Hab. Malacca.

This I find is the *Camang*, and I propose for it the name of Mangifera? policarpa, in allusion to its russet colored fruit, which seems to me unique in this genus.

a. One side of seed.

4. ***Mangifera odorata***, Gr.

Arbor magna. Folia ad apices ramulorum sparsa. (Petiolis uncialibus e medio infra incrassatis) oblongo-lanceolata cuspidato-acuminata coriacea, glabra subrepanda, venis 2-dariis distinctis, conspicue arcuatis.

Panicula terminalis, subglabra, fusco-viridescente, præsertim divisiones ultimæquæ cymosæ.

Flores polygami carnei suave odorata alabastra oblongo-conica.

Cal. e sepal. 5, oblong.

Pet. lanceolato-ovata, e medio refracto-reflexa, viridescente

sanguineo-tincta basi cordata, venis infra medium subcristatim elevatis.

Stam. 5, 2 sæpius 1, perfect, arising from a fleshy torus considerably above the plane of insertion of the petals. Filam. subulata sanguinea. Anth. purpureo-lilacinæ versatili biloculares.

Ovar. globosum glabrum. Stylus albus declinatus arcuatis, hinc sulcatus. Stigma simplex.

Ovulum anatropum, ex apice funicul. subbilariter orient. geniculat. flexi transvers.

Fruit like that of the *Bachang*, and with as bad an odour, oblong, filled with sticky gum exuding on being cut, yellowish green with yellow spots and a central disc of a reddish colour, which under a lens presents pores or holes, not compressed, situation of the style obscure, oblique.

Flesh yellow not unpleasantly scented, not turpentinish like that of an ordinary mango, very fibrous sweet, and plentiful, so that culture might make this a good fruit.

Stone very much compressed, covered with torn fibres, rather thick, lined with a parchment-like substance with oblong white markings.

Seed compressed very subreniform, outline with brown cellular coriaceous teguments, internally of a darker brown, much like a huge pear. Embryo of the same shape. Cotyledons flesh-colored, rather rugose with green edges, one as it were, just placed over the other, at the apex, is a little larger, both are equal at the base.

Radicle strongly curved and adpressed just like a curved Leguminose embryo. Plumule stalked conspicuous.

Hab. Malacca. *Oct.* 1842. Malay name *Koeene*, or *Kohini*.

Proxim. M. indicæ et M. fœtida, bachung.

Sp. Char. Fol. petiolis e medio incrassatis oblongo-lanceolatis acuminato-cuspidatis subrepandis coriaceis, venis 2-dariis conspicui arcuatis. Paniculis terminalis pyramidalis, divisionibus cymosis, floribus polygamis. Petal e medio reflexis calyce applicitis, staminibus e toro elevato. Stylo declinato.

Obs. The best marks of distinction are perhaps drawn from the fruit and the seed.

5. *Mangifera fœtida* Gr.

Fruit oval, not compressed, apex oblique, green, smooth, with a very fœtid smell, that of the common mango with a suffocating, most disagreeable addition.

Flesh yellow, thick, passing gradually into yellow fibres towards the drupe. Drupe covered with white fibres, compressed, almost two-edged, inner layer tough, parchment-like, seed erect, conformable, tegument chartaceous whitish, (brown inside) separating rather with the drupe than the embryo.

Cotyledons equal, oblique at the base, each with an auricle incumbent on the apex of the radicle, one margin (of the two together) as it were, elevated and thickened, so close together as to appear on a transverse section almost united, radicle short, almost a right angle with the cotyledones. Plumula conspicuous.

Fructu ovali, apice obliquusculo e compresso viridi fœtido

Hab. Malacca: Malay name *Bachang July*. 1842.

6. *Mangifera longipes* Gr.

Arbor.

Fol. alterna, petioli 2-2½ unciali teres graciles, basi incrassati. Lamina oblongo-lanceolata acuminata subrepanda coriacea glabra, venæ 2-dariæ radiusculæ conspicuæ interveniis minute reticulatis (Sapindacea.)

Panicula terminatis, subpyramidalis tenuis, divisionibus alternis cymosis vel racemosis. Bracteis inconspicuis deciduis.

Flores inconspicui polygami, vel masc. vel fæmin.

Pedicelli calycesque puberuli.

Cal. basi planiusculus e 5 sepalus, lanceolatis patentibus.

Pet. totidem angusti-lanceolat. ad medium subito-reflexa (refracta ?) albida, centro basique lutea.

Torus conicus papillosus e quo stamina oriuntur.

Stam. fertile 1, filamento longiusculo subulato glabro.

Anth. versatilis transvera purpurea (sterilia, parva, 2-3,) bilocularis longitud. dehiscent.

The cone is more or less 5-lobed, each opposed to a filament which arises from within its upper margin.

Ovar. subrotund. glabrum e cono ½ exsertum. Stylus obliquus longitud. fere filamento-subulatus glaber. Stigma terminali simplex.

Ovulum oblique ascendens, foramen infero.

Stam. quoad ovarium vero hypogyna. Tendency to carination of the petals at the base.

Petals with 5 elevated striæ or veins to which yellow colour in confined, these confluesce below.

HAB. Malacca, Malay vernac name *Boa Pow*.

It appears to approach to Roxb. Mang. sylvatica.

Mangifera longipes, petiolis elongatis, fol. oblongo-lanceolatis subrepandis.

Paniculi terminali tenui, pedicellis cymosis, racemosis. fasciculatis vel solitariis, petal. tertia medio refractis, basi 5-striatis. Toro 5-lobo inter stam. et petal. Stam. fertile 1. Stylo erecto, ovarioque glabro.

BOUEIA.

Boueia macrophylla, Gr. Pl. DLXVII. Fig. IV.

Arbor mediocris aspectu Guttifero. Corona oblonga densissima.

Ramuli teretes glaucescentes.

Folia opposita, petiola ½ uncialis ½ torta, lamina oblongo-lanceolata obtuse acuminata vel cuspidata crassa coriacea, patentia glabra, venis secondariis crebris sub Guttiferinis arcuatis distinctis interveniis more Terebinth : reticulatis. Gemmis (floralibus) axillaribus et terminalibus ovato-globosis squamis arcte imbricatis.

Paniculæ thyrsoideæ axillares foliis breviores densifloræ, divisiones ultimi cymosæ, ramulisque trichotomis.

Flores polygami parvi inconspicui virides, cito fucescent.

Cal. minutus subpubescens, 4-partit.

Petala erecta connivente imbricata concava, marginibus incurvis spathulato-obovata carnosa ! centro carinata, inserted by the stout fleshy bases into a torus above the level of the insertion of the calyx.

Stam. totidem interdum 3-5, petalis multo breviora, filam. ima basin connatis, inserted by their stout fleshy bases into a torus above the level of the insertion of the calyx. Anth. biloculi lateraliter dehiscentes, connectivum in mucronulum product. Rudiment. pistila minut. in basi cupulæ filamentor. connectorum.

Flos fæmineus whenever it exists, semper e centro trichotomus, much less numerous than the male. Calyx pubescens, 3-partitus. Petala et Stamina ut in mare.

Ovarium paululum obliqua, pubescens vel glabrum. Stylus robustus subulatus.

Stigma terminali hinc singularia, capitatum subintegerrime as if formed of two reniform lobes. Ovulum 1, suberectum attached to the ventral suture near the base, foramen inferum, tegument duplex, interius inclusum.

In the young fruit, the drupe is little or none, the seed large purplish, oblong reniform with a veined testa ? an inferior curved radicle and rather unequal cotyledons. Is there a tegument ? if not, the cotyledons are veined outside.

Fruit oblong ovate, little oblique, about the size of a hen's egg, not compressed, it is surrounded at the base by the remains of the perianth.

Pulp yellowish copious with fine fibres of a very acid taste without any admixture of turpentine or the usual mango flavor, although there is a slight mango smell. The nut, if it can be called so, is very thin, leathery, easily

cut, fine fibrous externally, this is lined inside by the adhering brown teguments of the seed.

Hence the embryo appears quite naked on opening, the drupe becoming exposed and conspicuous from its lilac colour.

Cotyledons equal plano-convex, outside reticulate rugose from the pressure of the inner surface of the drupe, inside of a deeper lilac! Embryo erect. Radicle curved, on line of the commissure of the cotyledons. Plumule conspicuous : a form of Leguminous embryo.

Hab. Malacca. Melay name *Roomanya Bartool.*

This is the large leaved species, which grows to a good sized tree, with a very dense oblong crown.

The smaller species, of which I have a flowering specimen from Rev. Mr. White : is the B. Peego, or from its very small leaves, B. microphylla. It also attains the size of a moderate tree, and has a dense crown.

The genus is certainly distinct from Mangifera, in habit particularly, but scarcely in the flowers, taking Mangifera comprehensively (Langoot, *M. lagenifera* as the test) and in the scarcely drupaceous evalvular fruit.

In the Mangifera oppositifolia of Roxburgh, Wight and Arnot say the style is composed of 3 combined, and that there are 3 stigmas, of which 2 are abortive ,and 1 fertile, and much larger.

Now if this were the case, it would be a direct passage to Buchanania, and in that group I see nothing like such a structure, and even if the stigma be 3-lobed as Roxburgh says, it does not follow that the style is compound ; on the contrary the ventral suture, and obliquity of the ovarium are against it, besides there is no dorsal sinus ; if stigma, the number of stamina is nothing, the erect embryo nothing, the keeled petals nothing, so that the only distinctions are habit and evalvular nuts, which last are constant.

In this plant there is the commencement of the structure of Syndesmis.

2. *Boueia microphylla*, Gr.

Fruit roundish oval, 17-18 lines long, 14-15 in diameter, of a yellow colour, surface veiny mottled elastic fleshy. At the base is a minute subquadrate calyx, and the remains of the style a little below the geometric apex, where also the fruit is rather depressed. Pulp copious, ½ an inch in thickness of, rather firm flesh, without fibres as in the mangoes, it is of golden yellow colour and of a rather pleasant subacid taste, tainted with that of turpentine.

Drupe thin, rather tough but not bony, outwardly floccosely fibrous, compressed, 13-14 lines long, 5 across the small diameter.

Seed conformable, the tegument is of the colour of burnt umber, thin, adhering to the inside of the drupe, partly separable.

Cotyledones rather unequal, firmly fleshy, lilac purple especially when cut. Surface irregular and veiny.

Radicle inferior. horizontal, on a line with the lower edge of the cotyledons.

Hab. Malacca. Malay name *Candanghan*. It is a variety of *Roomanya* Baitool, the Roomanya Pego, is a bastard kind, not called so from Pegu, as some say.

AMYRIDACEÆ.

Sabia.

Sabiæ sp. Pl. DLXVIII. Fig. II.

This plant is supposed to be a Sabia, if so, the character does not agree with that of Amyrideæ in any one essential point.

Cal. 5-sepalus æstivatione imbricata.

Cor. 5-petala hypogyna, æstivation imbricata, sepalis opposita.

Stam. fertilia 5, hypogyna, sepalis opposita ! discreta, filam. clavato-complanata viridia. Anthera terminalis bilocularis introrse, valva revoluta dehiscens.

Pollen læviusculum, 1-plicat.

Ovaria supera 2, connata, præsertim basin versus et ima apices stylorum, unilocularia bi-ovulata ovulis pendulis foramina ad apicem! loculi fundum ideo spectante, sursum in stylo subulato gradatim attenuata. Stigma simplex vix conspicue e 2 connatis format.

Cupula hypogyna gandulosa, evasculosa, 5-angulata, angulis sepalis alternis ! interspatiis denticulatis ovarii partem inferum cingit.

Frutices scandentes, foliis alternis exstipulatis indivisis, venis secondariis paginæ ad medium conspicue nexis arcuatum, venulis ab his dentibus iterum arcuato nexis, interstitiis articulatis ramulis ultimis subclavatis evanescentibus.

Cymis dichotomis paniculatis, inflorescentia axillaris vel terminalis basi squamis gemmaceis. Bracteæ minutissimæ inconspicuæ adpressæ.

Flores virides minuti. Vis aromat. nulla.

1. Alabastrum.
2. Imbrication and alternation.
3. Flower.
4. Same viewed vertically.
5. Same, petals removed as well as most of the stamina.
6. Sepals spread out shewing the glandular cup, and its alternation.
7. Genitalia.
8. Anther laterally.
8*a*. Dorsally.
9, 9*a*, 9*b*. Anthers in various stages of dehiscence.
10. Pollen in water.
11. Pistillum.
12. Ditto opened through the back of one carpellum.

13. Long section, double of pistillum, shews also the disposition of the vessels.
14. Ovulum. I am not quite certain as to its not having a second coat.

Hab. Pannukka Bootan.

This presents to my mind the maximum of opposition, the three outer series being strictly opposed, and if the angles of the cup be supposed to arise from, or point out the union of the barren stamina, the 4th series will likewise be opposite. But I prefer considering the angles as indicating the situation which the additional stamina would occupy, if developed.

This cup is evascular, and I may here remark that vascularity of organs depends entirely on the degree of development, hence stamina, when barren, to have vessels, must be passed a certain point in their development.

The anthers are curious, they open internally along the furrow separating the loculi, by separation of the edge of the valve from the connective hence no inner valve exists, as in almost all other cases.

Moisture causes the valve to return to its original direction, dryness causes its reflexion. The anther is altogether analogous to a single locellus of a bilocular bilocellate anther. Are we to imagine the total suppression of the inner valves, a tendency to which exists in some Hamamelideæ, or are we to imagine the internal union of the margins of the locelli, as the cause of this curious anomaly.

In the earliest stages in which I have been able to examine it, the formation of the anthers remains the same.

Hence even among typical anthers, two modifications are to be found, bilocular bilocellate anthers, resulting from the development of two leaves, and bilocular unilocellate, resulting from that of a single leaf. A distinction should evidently be drawn between these cases, the latter being

unilocular after dehiscence, the former being in every stage bilocular.

Lastly the ovary offers the anomaly of a vascular fascicle in the same line or nearly so as the placentæ.

The normal condition of an ovary is, to have one vascular fascicle in the axis of its dorsum, this may, or not be ramified in the ovary, but in almost all cases, it is single in the style; when not so, the number of carpella seems to be indicated by the grouping of the fascicles. This occurs in Cucurbitaceæ which seem to be binary carpelled, and the fascicles are divided into two groups, this point, however, requires fresh examination.

In this plant the fascicles are 4, and one of these is larger than the others, and it would appear to be generally separable into a fifth. As no fascicle has a right to exist in the situations these do, I conceive them to indicate the abortion of at least two, and perhaps three other carpella; and moreover, as vascularity is a test of perfection, that the apparently two styles, are nearly formed of 2 each, or one of two, and one of three. This must be the case, if my views of the permanence of the test afforded by the number of vascular fascicles in the style as an indication of the real number of carpella, be correct; because the styles, being more permanent than the ovary itself, must be developed considerably to enjoy such a supply of vessels.

The true affinities of this plant are obscure, it is nearer Burseraceæ than Amyrideæ.

The nearest affinity is probably with Celastrineæ.

CUPULIFERÆ.

Carpinus.

Carpini sp. DLXV. Fig. I.

Hab. Bootan Tongsa.

CRASSULACEÆ.

Sedum.

Sedum sp. Pl. DLXVIII. Fig. I. Itinerary Notes, p. 135, *no.* 581.

Hab. Bootan.

SAXIFRAGACEÆ.

Parnassia.

1. *Parnassia nana*, Gr. Pl. DLXX. Fig. II.

Caulis brevis. Folia inferiora plura sparse conferta reniformia sub 7-nervia, petiolis longissimis basin versus amplexicaulibus, idemque marginato-alatis, alis fimbriatis scapis unifloris, unifoliis, folio subsessili petiolo basin utrinque fimbriato, fimbriis potius ex auricula utrinque ortis, longissimis cito sphacelatis, venatio sui generis, venis primariis septenis, arcuatis media excepta, quæ ad apicem directi currit. primariis arcuatis ad eodem loco conniventibus currentibusque, interstitus venis tertiariis primaria oblique connectentibus mutuoque connexis occupatis.

Pedunculus 3-uncialis subclavatus, angulatus, angulis subulatis et e marginibus sepaloram sinu exteriorum originem ducentibus.

Sepala herbacea oblonga, 3 exteriora horumque margines ad folium decurrentes sed inferne minus distincti, 2 interiore venosa apice obtusa, brunnescente fimbriis paucis sphacelatis donata, æstivàtione quincunciali.

Pet. hypogyno subsessilia sepalis alternantia, obovata, obtussime apice ungueque exceptis fimbriata, æstivatione imbricata (uncialis ?) staminodia 5, petalis opposita, dichotomifurca, quædam glandulis stipitatis gerente, unia in sinu magis evoluto, lutescente apicibus lucidis.

Stamina 5, sepalis alternante hypogyna, seriei staminodiis internam formantia.

Filam. subulata basi dilatata. Antheræ aurantiaceæ, ovules basin affixæ, extrorsæ, loculis oblongis binis lateraliter dehiscent. connectivum viride infra emarginat.

Ovarium ovato-oblongum. Stylo crasso subconico stigmatibus 2-3 oblongis recurvatis terminat. 1-loculare, placentis stigmati numero æqualibus hisque oppositis.

Ovula 00, oblonga foramine conspicuo hili prope, tegumento 1-distincto, secundinio obsolete? nucleis cellulosus.

Calyx persistens post anthesin connivento-erectus staminodia apice sphacelata staminaque etiam persistentia.

Capsula basi 2-3 locularis, cæterum 1-locularis, 2-3 valvis, valvis revolutis, medio placentiferis basique medio septiferis, axi centrale brévissima.

Semina ovati-oblonga, funiculo brevi aspectu celluloso-exalbuminosa. Raphe parce elevata chalaza. Testa brunnea, extus cellulosa, simplex inconspicua. Embryo orthotropus radicula oblonga obtusa hili versus. Cotyledones minimæ interdum 3, carnosæ, plano-convexiusculæ, rotundatæ micropyle distinctiuscula ad latus hili cotyledones incumbentes. See Fig. III. Pl. DCXI. *a. b.*

Hab. Khasyah mountains *Bogapani*: *Nov. 5th,* 1835.

Meo sensu affinitas est cum Menyanthes et Villarsia, a quibus vix differt nonnisi situ relativo stigmatum placentarum, et forsan ovulorum structura.

Pollen hispidiusculum? aqua immersu Onagraroid.

De stigmatibus ignora, an quodque e 2 format. et tinct formatio normalis ut e lobis medio sulcatis stigmatis alabast. judicare licet. Hoc casu, dehiscentia loculicida. Differt a Gentianeis corolla polypetala, signum forsan flocei habendum, et seminibus exalbuminosis, an omnino.

2. *Parnassiæ* sp. Pl. DXX. Fig. I.

Saxifraga.

Saxifraga adoxoidea, Gr. Pl. DLXX. Fig. III. Itinerary Notes, p. 129, *no.* 515.

Hydrangeæ.

1. *Hydrangeæ*? sp. Pl. DLXIX. Fig. I. Itinerary Notes, p. 184. *no*. 939.

Hab. Bootan.

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2. *Hydrangeaceæ* Gen. Novum Pl. DLXXI. Itinerary Notes, p. 173. *no*. 890.

Adamia.

Adamiæ sp. Pl. DLXIX. Fig. II. Itinerary Notes, p. 175, *no*. 895.

CUNONIACEÆ.

Cunoniaceæ ? sp. Pl. CCCCLXXXVI. Fig. I.

Ramuli (foliaque subtis) ferrugineo-pubescenti, articulis incrassatis elongati ad articulos (stipulis et lapsis,) annulatis. Stipulæ inter petiolares, e basi cordates acuminatæ, ferrugineo-pubescentes, pubes stellata subtus copiosa uti in ramulos, supra sparsa.

Glomerul. dichotom. pedun. brevis lignoso persist.

Vernatio folior. conduplicato bi-involutivo.

Folia breve petiolata, oblonga, concava cuspidato acuminata vel obtusa margine glanduloso-crenulata, crenulis piliferis, venis 2-dariis distinctis, leviter arcuatis.

Flores glomerulati, in axillis breviter petiolati, petioli basi articulati (bracteolis minimis interspersis) ferrigineo-pubescenti majusculi inconspicui. Perianth. carnosum coriaceum.

Flores campanulato-infundibuliformes (cito areolata) valvati, æstivatione 5-dentati, dentibus reflexis, extus ferrugineo-puberuli.

Stam. fauci inserta, numero duplo, filam. brevissima basi dilatatà subcoalita, horizontales. Anther. oblongæ biloculares

lateral. dehiscentes, medio affixæ, quasi nutantes ad basin tubi perianth. prope stylum basi annulus villosus.

Ovar. inferum, stylus breviusculus 10-loculare. Ovula 00, minuta alba l funicles ½ the length of ovule, robustus. Stigma inclusum, discoideum, lobes or crenature tot quot locul. faucen subæquans.

Pet. 5 minuta marginibus inciso-dentatis. subcordata, valvata, vel conduplicato-valvata (*marginibus subinflexis*,) extus pubescentia peranthesin conduplicata.

Bacca pedicellis elongatis nutantes cum calyce unceolata tubo fere immulato faucem filamentigera, 10 loculares, stylo stigmata terminat.

Semina 00. in loculis, l-seriata, angulo interior affixa, anatropa, minuta, multa abortient. rubro-brunnia nitentia rugosula superfici minutissimeque striata, raphe ½ completa clavata albida. Tegum. exterius memb. cellulos. tenuissim. oblonge *areolat*. interius crassum rubro-bruneum coriaceum.

Albumen copiosum carnosum. Embryo axillis virides-cens pallida, radicula teres longa. Cotyledones parvæ planius-culæ. Plumula. ?

Hab. Malacca, at Verupha. Certe Cunoniacea, stigmatis extus 10, crenato-lobatus verticeo depressiusculo pubescent. 1842.

The membrane covering the albumen is searcely demons-trable.

Obs. This remarkable plant, has the habit of the other Malacca Cunoniacea and the inflorescence, but otherwise is considerably different, especially in the inferior ovary, the Santalaceous calyx becoming in the fruit obpyriform, and the coalescent stigmata.

The aspect of the flowers at first is entirely Tubiferosa.

Cal. tubulosus superus 5-dentatus. Pet. 5-sinubus inserta, minuta conduplicata inciso-dentata.

Stam. 10.

Ovarium inferum, 10-loculare, ovula 00, anatropa. Stylus cylindraceus. Stigma discoideum. margine 10-crenato-lobatum.

Bacca inclusum obpyriformis, calyce immulato coronat. Semina 00.

Arbuscula, ferrugineo-pubescens, fol. oblongis, bifariis, stipulis cordato-acuminatis. Flores ferrugino-viridii in axillis glomerati subsessiles. Fructu pedicelli elongati.

Malacca: 1842.

Cunoniacea altera hoc charactere diagnoscenda.

Cal. inferus basi planus profunde 4 partitus. Pet. 5, sinubus inserta, conduplicata fimbriata lacera.

Stam.

Ovar. 5-6 loculare basi plana calycis adnat. stylus brevis apice 6-partit. Stigma 6, subreniform. Fructus superus pisiformis baccatus, calyce immulato basi cinctus, 5-6 locularis.

Frutex foliis oppositis glabris ovatis vel lanceolatis, stipulis interpetiol. longis, flores in axillis glomerati minuti. Baccæ nigræ.

CHRYSOBALANEÆ.

Cycnia.

Cycnia spinosa.

Frutex ramis inferioribus in spinas abeuntibus uti etiam ramuli pauci, fol. alterna lanceolato-linearia, acuta serrulata. Stipulæ ovatæ, membranaceæ. Racemis terminalibus pauci floris, floribus majusculis.

Cal. tubo brevi turbinato 5-partit. laciniis rotundatis, patente concavis. Pet. 0.

Stam. 00, disco perigyno carnoso parum elevato insert. libera, filam. brevia filiformia.

Anth. didymæ, longit. dehiscenti connectivo dilattati. ovati.

Ovar. subturbinat. 1-loculare, 1-ovulat. ovule lateraliter et juxta basin styli insertum, foram. hilum prope. Stylus lateralis fere basilaris filiform sulcat. Stigma capitat.

Fructus oblongus obtussiss. basin versus stylum gerens,

longe exsertus baccat? 1-locule, 1-spermum. Semen erectum, conforme.

Cotyledones foliaceo-carnosæ, conduplicat.? Radicula infera hilum versus.

Pl. DCV. Fig. V. Ex sicca Mergui: *Jan.* 1835.

An vere apetala? 5-sepalis alternantes discernendæ, tunc more ordinis, 5-petala esset.

Prinsepia.

Prinsepia utilis, Pl. DLXXX. Fig. I.

Hab. Bootan.

CONARACEÆ.

Cnestis.

1. ***Cnestis ramiflora*** Gr.

Frutex humilis, foliis impari-pinnatis, foliolis alternantibus, oblongis acutis basi cordatis, subtus pubescente, junioribus discoloribus, lutescentibus vel rubescentib.

Racemis confertis, paniculatis abbreviatis in trunco raro ex axillis foliorum, floribus lutescentibus, odore forti subsuavi.

Pedunculis, pedicellis calycibusque junioribus purpureo-pubescent.

Pedicellis brevibus paullo supra basin 3-bracteolatis.

Cal. 5-sepalus, sepalis linearib. pubescent.

Pet. totidem conforme sed latiore, patentis, apicibus incurvis.

Stam. 10 hypogyna, libera, filam. brevia filifor. Anth. bilocul. didymæ extrorsæ transverse dehiscent. Carpella, 5 extus pilos hispidissime. Styli totidem breves filiformes. Stigmata 5 capitato-reniformia.

Ovar. 1-locularia biovulata ovulis ascendentibus, foramine conspicuo ad apicem.

Calyces æstivatio valvata subaperta, sepalis nempe apicibus inflexis coalitis marginibus liberis, æstivat. petalorum valvata. Pollen ovatum læve hinc sulcatum.

Hab. In sylvis graminosis. Mergue : *Nov.* 1834.

2. *Cnestis steriopetala*, Gr. Pl. DCXI. Fig. II.

Frutex scandens ramulis petiolisque hirsutis, fol. pinnat. 4-juga cum impari, foliol. alternant obovata, basi supera oblique emarginata atroviridia, subtus reticulata, et ad nervum medium parce pubescent.

Floribus axillaribus racemosis albis. Racemis abbreviatis, foliis multo breviorib. Pedicellis elongatis filiformib. basi bracteatis, bracteis ovatis ferrugineo-pubescent.

Cal. 5-sepalus, sepalis lanceolatis acutis patentiss. apicibus pubescent. æstivatione imbricata.

Pet. 5 hypogyna linearia angustissime longissime, sepalis nempe $2\frac{1}{2}$ longiora acuta, æstivat. apicibus.

Stam. 10 alterna breviora petalis opposita inflexis ima basin monadelph. filam. subulato. Anth. biloculares longit. dehiscentes subintrorsæ. Styli 5 filiformes subglabri, stigmata totidem capitata. Carpella 5 omnino distincti extus pilosa, 1-locularia, 2-ovulat. Ovulis ascendentibus, foramen apicul. conspicuum.

Hab. In sylvis inter Kulweng et Mergue : *January*, 1835, floribus subodoratis.

3. *Cnestis flaminea*, Gr. Pl. DCVIII. Fig. II.

Carpella sæpius solitaria (abortu interdum 2-4 radiantia ut in Sterculeaceæ leguminiformia, coriaceo-baccata, pendula, pulcherrime viridique coccinea, velutina, secus ventrem convexum (inferum obsitum pendulum) dehiscent. 1-locularia 1-sperma.

Endocarpium intus velutino sericeum, semen erectum. basin arillo carnoso luteo crasso, apice lobato cinctum.

Testa aterrime nitida. Albumen carnos. copiosum. Embryo inversus. Cotyledones magnæ planæ foliaceæ.

Radicle brevis obtusa supera. Plumule inconspicue. Hilum lineare supra latus convexus seminis fere ad medium currens (*a b.*), arillus obliquus.

Hab. Mergue. Pili endorcarpii simplices. Fructus maturat. *March*, 1835.

Cnestis platantha, Gr.

Fruticosa scandens pubescens, foliolis sub 10-jugis linearioblongis obtusis basi inæqualiter cordatis. Paniculis racemiformibus foliis brevioribus, floribus rotatis, petalis emarginatis, ovariis 5-6-7.

Descr. Frutex scandens.

Pubescens ramuli abbreviati obtuse angulati.

Folia spithamæa 10-juga cum impari, foliolis breve petiolutatis lineari-oblongis basi inæqualiter cordatis, obtusis, long. 1-uncial. 7-lineal. latit. 6-lineal. pendula? an semper tactu molli.

Paniculæ racemiformes in ramulis abbreviates axillaribus (fol. lapsor) incertes, ideoque quasi fasciculatis, digit. longitudine nutantes cum pedicellis calycibusque extus glanduloso-puberules.

Bractea minuta concava squamiformis subpedicel. quemque et prope basin, qua articulatur, bracteolæ minimæ 2. Pedicelli alterne vel subopposite clavati, subbilineales.

Flores cuique racemo rotati.

Sepala sublanceolata, æstivatio leviter imbricata fere valvula apicibus subintroflexis, utrinque pubescentia extus capitulis pilis rubro-glandulosis immixtis, (this is the character of the pubescence of inflorescence).

Petala alba, lineari-oblonga paullo longiora, sæpius emarginata, marginibus et apice æstivatione inflexis, stamina 10, biseriata, 5 sepalis oppositis majoribus.

Filamenta alba, subfiliformia longiora petalis subtriplo-

brevissim. Antheræ biloculares, basi affixæ, petales oppositi paullo majores fere didymæ sæpius forsan 6. Si 6, 5 petalis subopposita, si 5 petalis opposita, plura quam 5 minora emarginata longiuscula.

Pollen albidum, immers. globos. triplicat.

Ovaria 5, sæpius forsan 6, minuta villosa staminibus paullo breviora.

Styli breves. Stigmata simplicia emarginata. Ovula 2 atropa, erecta, secundo longiusculi prominento ad anthesin etiam.

Hab. Malacca.

Arnott and Wight make Jack's species to belong to Rourea, but Jack says nothing of the æstivation of the calyx, and this judging from Arnott's character of Rourea is the only distinction between Rourea and Cnestis: Jack's Plants are Cnestes of Endlicher, who makes Rourea a synonym of Connarus.

Robergia hirsuta, as has been well suggested, is very likely Phlebochiton extensus.

This plant seems allied to Cnestis polyphyllus. Lam.

Eurycoma.

Eurycoma longifolia.

Frutex 7-10 pedalis. Ramis sæpius simplicibus apicibus proliferis, foliis summis cujusque crescentiores abortivis et in forma processimve subulatorum apicibus incurvis ferrugineo-pubescente remanentib.

Caulibus apicibus dense læteque ferrugineo-pubescent.

Fol. sparsis, confertis ad apices ramorum impari-pinnatis, pluri-jugis 2-2½ pedalibus, foliolis oblongo-lanceolatis subsessilibus, superne ad basin subobliquis obtusis penninervis, nervis indistinctis juniorib. supra læte viridib. infra argenteo-glaucis senioribus supra atro-viridib.

Petiolis basi incrassatis ferrugineo-pubescence.

Paniculis axillaribus solitariis foliis multe breviorib. ferrugineo glanduloso pubescente.

Floribus minutis solitariis, brunneo-sanguinea, cal 5-sepal. sepalis lanceolatis more pedunculi pubescent. æstivatione valvatis.

Pet. 5 erecto-patentia hypogyna lanceolata sepalis alternantia, breve pubescent. apicibus incurvis æstivatione valvata, more sepal. sed multo minus dorso ferrugineo-pubescent.

Stam. tot quot petala, iis alternantia libera hypogyna filam. subulata, rubro-coccinea ut petala intus albido-pilosa.

Anth. biloculares longit. lateraliterque dehiscent. basibus affixæ. Stam. ad basin 2-glandulosa, glandulis oblongis luteis sessilibus, stylus crassus brevis.

Stigma 5, subcapitata lutescentia, carpella 5, extus pilosa, inter se vix cohærentia, ovulum 1 cuique carpello, erectum, foramen conspicuum pilo oppositum.

Eurycoma longifolia Jack.

Mergue In sylvis. Ins. Madamaca apud Peleit: *Nov.* 1834.

LEGUMINOSÆ.

Crotalaria.

1. *Crotalaria bracteata.*

Herba 2-3 pedalis, ramosa pubescent. Rami teretes.

Fol. 3-foliolata, petiolata, (petiola superne canaliculato) foliolis lanceolatis subacuminatis cum mucrona, iutegris, subtus pubescentibus, terminali majore.

Stipulæ deciduæ, subulatæ, parvæ fere rectæ.

Racemi oppositifolii terminalesque.

Flores cernui primo lutei demum aurantiacei.

Pedicelli basi bracteati.

Cal. basi 2-bracteat. bilabiatim 5-5$\frac{2}{3}$ partibus, vexillum cordatum acutum reflexum.

Alæ oblongæ, obtusæ parvæ, carina falcata concreta acuminata.

Stam. monadelpha tubo antica ad basin fissura. Anth. oblongæ.

Ovarium 1-locul. Ovulis 00. Stylus curvatus, antice pilosus. Stigma obliquum subcapitat.

Legumen teres, subinflatum villoso-tomentosum, polyspermum, pedicellatum, pedicello libero.

HAB. In ruderatis, Moulmein : *Dec.* 1824.

2. *Crotalariæ* sp.

Herbacea basi suffruticosa Fol. palmatim 5-foliolatis, foliolis inæqualibus lineari-spathulatis, mucronatis, emarginatis, ciliatis, subtus sericeis.

Racemis terminalibus bracteatis. Bracteis lanceolatis acuminatis deflexis. Pedicellis subnutant. basin versus oppositis 2-bracteolatis.

Calyce $\frac{2}{3}$ bilabiato, dentibus subæqualibus, vexillo alisque luteis, brunneo-striatis carina naviculari viridescente. Legumenibus inflatis, ovulis reniformibus, biseriatis, staminib. 1-delphis tubo superne demum fisso.

HAB. In ruderatis. Pulo Gewen : *Nov.* 1834.

MELILOTUS.

Meliloti sp. Pl. DLXXVIII. Itinerary Notes, *no* 1395.

HAB. Assam.

CYTISUS.

Cytisus Laburnum, Pl. DLXXVII. Fig. III.

The legume of Cytisus Laburnum, showing the spontaneous separation of the Endorcarp from the Mesocarp along the line of the placental and dorsal satures. The seeds remaining attached to the two unseparated laminæ : *a* seed, *b hilum*, *c* foramen to which the radicle points : an instance of Mirbels campulitrope seed. *May* 24*th*, 1831.

INDIGOFERA.

Indigoferæ. sp.

Suffruticosa basi caulibus adpressa pilosis, foliis 3-foliatis, lanceolato-ovatis, basi 3-nerviis, lateralibus obliquis.

Racemis paniculatis axillaribus abbrevietis, floribus confertis inconspicuis, vexillum viridescens veniis sanguineis pulchre notatis, alæ oblongæ purpureæ lateri superiore ad basin limbo dente alba. Carina navicular.

Stigma capitat. exsertum.

Cal. profunde 5-partitus, sepalis lineari-subulatis, antico majora. Legumina ovata, calycis dentem longiorem, subæquante 2-sperma. Cotyledones carnosæ, oblongæ. Plumula conspicua.

Radicula teres brevis curvata. Tubus stamen. superne. fissus, ovarium 2-ovulatum.

HAB. In humidis Mergue · *Nov.* 1834, etiam Moulmein.

AGATI.

Agati grandiflora.

Arbuscula, foliis pinatis, 10-18 jugis, foliolis oblongo-linearibus, obtusis mucronatis.

Racemis axillaribus, paucifloris.

Pedicellis ad basin articulatis, subflora bibracteatis.

Bracteis ovatis foliaceis caducis, floribus maximis, purpureis vel albis.

Cal. infundibulifor. bilabiatus labius utrinque subintegris.

Cor. papilionacea maxima, vexillum ovato-oblongum reflexum longiuscula unguiculat. alæ vexillo longiores falcatæ lanceolatæ subacutæ. longe unguicuiculatæ. Carina longe unguiculata, navicularis, apice bifida, basin limbum versus 2-dentat. dentibus subrevolutis.

Stam. diadelpha 9 et 1-longissima,

Anth. versatiles. Tubo staminеus basin superne gibbus carnosusque.

Ovarium stipitat. longissime, subcylindraceum.

Stylus filiforme subulatus. Stigma capitat. 1-loculare, multo: ovulat.

HAB. Mergue culta: *Nov.* 1834.

DESMODIUM.

1. *Desmodii* sp.

Herbacea decumbens adpresse pilosa.

Foliis pinnatis 1-jugis cum impari ; foliolis oblongo-ellipticis basi subcordatis reticulatis integris subtus glaucis terminali majore, stipulas membranaceas linearib. acuminatiss. stipellis conformibus, minoribus.

Racemis flor. pyramidal. terminalibus, axillaribusque multifloris bracteatis, bracteis ovatis acuminatis, subscariosis nervosis ciliatis, deciduis, floribus binis in axillis bractearum, purpureis, cernuis, pedicellis gracillis, 2-linealibus.

Cal. tubo brevi, limbo bilabiato partito, lab. super bjalato, inferior 3-fido.

Vexillum subobcordat. alis suboppositum intus suturat. purpureo-maculis 2, lutescent, ad unguem, extus pallidum, alæ oblongæ extus saturati purpureæ, intus pallidæ, carinæ subcohærentes. Carina navicularif. utrinque basin versus, 1-dentat.

Stam. diadelpha 9 et 1, tubo stamineo recto.

Stigma capitat. stylus post anthesin in ovario decumbens, Ovarium compressum glanduloso pubescens ? 1-loculare pluri ovulat. Legum.

HAB. In graminosis. Mergue : *Oct.* 1834.

2. *Desmodii* sp.

Suffruticosa erecto-ramosa, ramulis pilosis, pilis medio affixis.

Foliis 1-jugis cum impari elliptico-lanceolatis basi cordatis emarginatis cum mucrone, integris reticulatis subtus deflexopilosis.

Stipulis membranaceis stipellisque longe acuminatis, subcrescentis Racemis, terminalibus pubescentibus.

Bracteis cordato-acuminatis deciduis ciliatis, floribus binatim aggregatis.

Cal. lab. super emarginato, infer. 3-dentato vexillum carina brevius, carina navicularis hinc medium infra 1-dentat.

Stam. diadelph. 9 et 1, Stigma capitat.

Legumina lomentacea subfalcata, margine superiora placentifera integra venosa, pilis uncinatis hispida articulis, 1-spermi indehiscentibus.

Flores pallide alis saturatius cæruleis notato etiam carinæ apex.

Hab. In hortis prope Mergue : *Oct.* 1834.

Varias foliolis elongatis lanceolatis angustioribus.

Dicerma.

Dicerma pulchellum.

Fruticosa erecta, ramis verrucosis ramulis velutinis. Fol. pinnatis 1-jugis cum impari, foliolis lanceolatis acuminatis repandis utrinque sed præsertim subtus ad venas pubescentibus reticulatis, stipulis basi latis apicibus setaceis, stipellis basi angustiorib.

Ramulis floriferis axillaribus terminalibusque foliis floralibus distichis imbricatis stipatis. breviter petiolatis, petiola in setam abeunte, 1-jugis foliolis cordato-orbicularib. subrepandis nervosis reticulatis, mucronatis stipulis stipillisque lanceolatis acuminatis castaneis.

Floribus pluribus in axillis folio floralis, eoque obtectis, albis cujusque parvis pedicellis brevibus basi bracteolat.

Cal. basi bracteolat. bilabiat, lab. superior integro infer. 3-fido.

Cor. papilionacea, vexillum oblongam sepalis tubo opposit. Alæ lineares late superior ad unguem 1-dentat. lamina breviores carina arcte cohærens.

Stam. diadelpha 9 et 1, stylus pilosus apice glabrus, stigma subcapitat. medio constricta ideoque longe setacea stylo terminal 2-ovulato.

Hab. In sylvis Mergui etiam Moulmein

Erythrina.

Erythrina bisetosa.

Arbor humilis, trunco albo crasso, ramulis aculeatis, petiolisque pubescenti-vellutinis, fol. longe petiolatis (juniorib.) rhombeo-deltoid. subacuminatis, 3-nerviis, petiolulis brevibus lateralibus basi glandulosis. terminali biglandulos. Stipeli lineares foliaceæ reflexæ.

Racemis ante flores evolutis, terminalibus secundis densifloris, floribus spiraliter dispositis, maximis coccineis, pedicellis nutantibus, velutinis, calyce extus velutino-pubescens.

Cal. basi 2-bracteolat. bracteolis setaceis deciduis, tubulosus, ore truncato, setas 2 coloratis (dentes) gerenti ad anthesin postice fisso.

Cor. papilionacea vexillo maximo obovato ascendente, postico coccineo carinæque petali conforma, multoties breviore, oblonga obtussima sanguinea.

Stam. subdiadelph. tubo declinato a medio filamentisque coccineis. Anth. lineares versatiles. Stylus elongatus subulat. Stigma capitat.

Ovar. longe stipitat. fusco-pubescent. velutin. 1-loculare pauci ovulat.

Circa Mergue, prope luta: *January*, 1835.

Megalotropis.

Megalotropis buteiformis, Voight.

The following description of the plant in flower, is taken from specimens flourishing in the Bot. Garden Serampore.

4-5 pedalis robusta. Caule parum ramoso flexuoso angulato, pube dense alba.

Stipulis caducis.

Fol. omnino Buteæ subcoriacea subasperula deltiformi-cordata acuminata repanda, subtus albida laterali basi inferne obliqua. Petiolis pedalibus, stipellis fol. laterat. oblique cordato-ovat. solitar. fol. terminalis 2, quasi dimidiata.

Flores racemoso-paniculati, pæniculis erectis, folii subæquant. racemis abbreviatis quasi in capitulos, paucifloros.

Pedicelli sæpe semitorti ideoque flos sæpe resupinatus.

Calyx tubulosus, coriaceis dorso faucem posticum (vexillo opposit) crenat. 3-dentatus non bilabiatus, dentibus 2 posticis confluentibus *emarginatione minima excepta.*

Cor. papilionacea coccinia sericeum vexillum oblongum alas subæquant. alæ oblongis ungue laminam subæquanti liberæ.

Carina petalis reliquis longior. condup. convolut. partibus apices versus tantum concretis.

Processus dentiformes coccinei reflexi. utrinque labellum prope apicem unguis indistinctiuscul.

Stam. diadelpha 9 et 1. Filam. infera pilosa. Anth. medio affixæ biloculares longitud. dehiscent.

Stylus subulatus basin excepta glabratus. Stigma oblongo-capitat. terminal.

Ovarium posticum gibbum e basin ad apicem styli gradatim attenuat. Ovula 2 ad formam sursum spectantum.

Legumen junioris, with calyce sphacelate but unchanged, basin stipat. obovate strap-shaped, suturis 2 elevatis (subsessili) so far as regards the calyx the pubescens venoso rugosum.

Semen unicum apicem versus, the lower ovulum now distant and abortive.

Legume in outline scimitar-shaped compressed aspero-pubescent. suturis præsertim interior placentigeri incrassatis venoso-reticulatis coriaceum apice sublignea. Semen unicum ad apicem teguminum magum, album enclosed in a cell of its own size, the other laminæ otherwise intimately adherent, obovate-reniforme, micropyle mammilate hilum prope.

Tegum. unicum crassim spogiosum, that is, with a spongy *diploæ.*

Embryo conformat semen. Cotyledones superum auriculatæ, auriculis out-topping the apex of the short conical root ; which is curved. Plumule majuscula.

I sent the seeds of this plant to Dr. Voight of Serampore, from the Gyntea or Sylhet Hills, alt. 3500 feet, where I found it in fruit in the latter end of the year 1837, it was there a stout suffruticose plant, growing in company ; and I called it Butea suffruticosa.

Pongamia.

1. ***Pongamia glandulosa.***

Arborea, fol. pinnatis, 8-jugis cum impari, fol. oblongis basi cordatis, emarginatis, coriaceis venosis. Petiolis supra canaliculat. basi valde tumidis et quasi in cyathum corticis receptis.

Paniculis racemosis amplissimis longissimisque, floribus parvis inconspicuis nutant. calycibus atro-sanguineis, vix sanguineo-coccinea, basi viridescent. alæ carinaque albæ plus minus roseo-tinctæ.

Cal. turbinat. tubo brevi, limbo truncato subinflexo, obsolete 5-dentato.

Cor. papilion. vix cordato-reniformia ascend. alis carinaque brevior. Carinæ petal. ad basin limbi 2-dentat.

Ovar. stylusque brevis pubescens. Stigma simplex, glandulæ ovatæ hypogynæ 10, ovarium basin cingens! parce pilosæ, stylis apicem versus glaber. Ovar. 1-loculare pluriovulat.

Hab. Mergui: *January*, 1835.

Ob glandulus perigynus typus Leguminosarum interdum icosand. Affinis sp. 2. Pongamia atropurpurea.

2. *Pongamiæ* sp.

Arbor 30 pedalis, umbrosa, foliis pinnatis 4-5 jugis cum impari, foliolis ovali-acuminatis basi inæqualibus, obtusis integerrimis coriaceis reticulat. Paniculis racemosis, terminalibus, fusco-velutinis. Racemis densifloris.

Pedicellis brevibus articulatis basi bracteatis, bractea parva ovata caduca.

Calycibus atterrima purpureis, corolla sanguinea macula lutea ad basin vexilli.

Cal. basi 2-bracteolat. tubo brevi, limbo subbilabiata, lab. super emarginato rotundato, inf. 3-dentato, dentib. acutis, vix ascendens. Alæ oblongæ carinæ longitud. ad apicem unguis, bi-auriculat. Carina navicularis.

Stam. diadelpha 9 et 1, filam. subulata. Anth. ovatæ bilocular. Pollen oblongum hinc sulcat.

Cupula perigyna, obtuse dentata, ovarium pubescens stipitum cingens. Ovula stipulata. Stylus brevis. Stigma simplex acute, 1-loculare, pauci-ovulat. Legume.

Hab. In sylvis. Ins. Madamaca: *January*, 1835.

Dalhousiea.

1. *Dalhousiea bracteata*, Gr.

Frutex erectus, ramulorum cortex albescens, stipulæ lanceolatæ, subcoriaceæ, persistentes. Petioli 2-unciales utrinque incrassati ibidemque rugosuli.

Fol. simplicea, ovati-oblonga, basi cordata vel subpeltata, cuspidata, cuspida brevi-obtusa repanda, subtus parce pilosa utrinque nitida, penninervia, venulæ arcuatæ conspicuæ.

Panicula terminalis pubescens disticha, ramis basi bibracteatis, bracteis stipuliformibus, bracteolæ suborbiculares integri ad basin cujusque pedicelli, et his abortientibus medium versus rami.

Bracteolæ his omnino conformes sed oblongæ, recta sinistraque, plurivenosæ, alabastra omnino includentes.

Cal. urceolatus quasi depressus, piloso pubescens margine subinvoluta, dentibus 5 obsoletis, quarum 2 anticæ majores.

Cor. papilionacea, vexillum late obcordatum, longiusculi-stipitat. macula lutea unguem versus, alæ oblongæ hinc, denticulatæ. Carina e petalis 2, leviter cohærentibus, bipartita.

Stam. 10 his vexillum versus vel brevioribus, ima basin coalita. Filam. subulata. Anth. adnatæ biloculares.

Ovarium breve stipitatum, 1-loculare sub 4-ovulatum. Stylus subulatus. Stigma terminali subcapitatum papillosum minutum. Ovula, breve funiculata, *alterna*, foramen conspicuum, papilliforme hilum versus styli basi versus aspiciens.

Legumen ovatum, compressiusculum, utrinque acutum subinflatum, bivalve.

Semen 1, an semper, testa ovato-oblongum compressum testa castaneo-lutescente, adhærens. Cotyledones maximæ carnosæ, plano-convexæ semini-conformes. Radicula brevis recta conica. Plumula subconspicua diphylla?

Podalyria bracteata Roxb.

Hab. In Colliculis Chattuc et Charra Poonjee inter: *Oct. 7th*, 1835.

2. *Dalhousiea paucisperma*, Gr. Pl. DCIII. Fig. IV.

Arbuscula, stipulis ovatis membranaceis brunneis deciduis, petiolis utrinque valde incrssatis, foliis late ovatis breviter acuminatis, basin subcordatis integris supra lucidis, venis secondariis arcuata nexis interstitiis reticulatis, floribus axillaribus solitariis.

Pedunculo medio et ad apicem bibracteato, bracteis late ovatis, membranaceis, caducis, bi-articulato.

Legumen breviter crasseque stipitatum, a medio infra brunneum, basi bracteis 2 suffulto, oblongo-ovatum magis ventricosum ac in plantum precedent. subfalcatum, apice acutiusculo compresso, styli ima basi apiculat. nec ne, biloculare bivalve oligosperma.

Semina 1-3 maxima castanea luteo-tincta difformia, faciebus contiguis planis, cæterum utrinque convexis, summo,

infimoque quando triaplaniuscula, lævia, micropyle inconspicue. Chalaza linearis, latiuscula. Raphe inconspicua. Tegumenta sub-3-na extus, intus coriaceo-membranacea 2 interiora præsertim interna cellulosa. Cotyledones semini conformes carnosæ, plano-convexæ. Radicula obtusa fere hæmisphærica hili latus ad superum. Plumula conspicua.

HAB. Assam. Noadwar: *February* 17*th*, 1836.

CÆSALPINIA.

Cæsalpinia paniculata, Roxb.

Rami teretes aculeis brunneis uncinatis sparsi viridescentes. Folia bipinnata, superiora subpedalia, petiolo aculeato.

Pinnæ distantes, sub-4-jugæ, subdigitates, petiolules aculeolatis.

Foliola 2-3 juga, petiolululi sublineales, lamina lanceotata obtusa coriacea, integerrima, long. 15-16 lin. lat. 7-8 lineali, subtus glauca, et reticulata depresso.

Panicula terminalis, rami inferiores 2-3 ramosi, reliqui simplices, pedunculo communi inferne aculeato.

Flores in pedicelles articulati 3-4 lineali. lutescentibus basi bractea nigrescente squamiformi acuminata suffultes; majusculi aurei.

Cal. tubus obconicus obliquus, nempe centro lateri inferiore contiguore compressus ad bases laciniarum coloratum lineari-oblongarum concavarum reflexo-patentium gibbosus. sepal. infer. (anticum) majus paullo, et cucullatum, æstivatione extimum.

Pet. obovata, sepalorum circiter longitudine, sed duplo latiore, 2 lateralia superiora patentia, 2 lateralia inferiora patente porrecta, 5-tum summum (posticum) minus patens angustior spathulato-lingulatum, æstivatione 2 lateral. superior imbricatum, vel ungue lobo tubo filamentorum imposito lamiana cordato-ovata erecta, sanguineo venoso, petalis aliis, duplo minor.

Adelphus villoso-pubescens subdeclinatus, filamentis distinctis insertis calyce ad gibberes, subæqualibus, subulatis, petalis longioribus.

Antheræ brunneæ, lanceolato-ovatæ basin affixæ biloculares, pollen aurantiaceum. Ovarium villoso-pubescens basi angustatum in stylo filiformi viridi staminum longitudini gradatim attenuat.

Ov. centrum placentæ versus 1-ovulatum (an unquam.)

Stylus apice incrassatus, perforatus, aperturæ margines ciliolati, stigma nulla nisi apertura citata.

Arnott makes the colored calyx part of the generic char. of Pterolobium.

The leaves were not observed to be ferruginous or rusty underneath, but glaucous.

PARKINSONIA.

Parkinsonia aculeata.

Frutex 10-15 pedalis. Rami flexuosi. Folia bipinnata bijuga, pinnis petiolis alatis complanatis, basibus rotundis incrassatis, apicibus attenuatis. Foliolis parvis, alternis, ovatis petiolatis. Petiolo commune in aculeum desinent. alatus utrinque 1-glanduloso.

Flores racemosi terminali flavi, petalo antico maculis rubris, pedunculatim, pedunculis cum racemo articulatis, flores odorati.

Cal. 5-sepalus, sepalis subæqualibus reflexis lanceolatis basibus in tubum brevem vel potius cyathum persistentem concretis, æstivatio imbricata, sepalo postico reliqua superposito.

Pet. 5 perigyna, sepalis alterna, 4 fere sessilia, 1 antico unguiculato subvexillæformi.

Stam. 10 perigyna. Filamenta biserialia, seriei externa sepalis, interna petalis opposita, filiformia, versus bases pilosa. Antheræ medio dorsi affixæ, bilocul. longitud.

dehiscentes. Pollen oblongum læve in aqua immersum materiam oleosam emittens.

Ovarium sessile. Stylus filiformis, Stigma simplex obliquum, ovar. pilosum, 1-loculare, pauci-ovulatum tegumen basin cyatho persistento stipitatum glabrum.

Hab. Circa Madras frequinter culta, sæpius in sepibus crescit.

Cassia.

Cassia alata.

Frutex annuus, 4-8 pedalis, foliis pinnatis 12-14 jugis, foliolis oblongis mucronato-acutis, subsessilibus penninerviis, nervis secondariis conspicuis, basi infera obliquis, infimis axillæ proximis, glabris, petiolo supera late canaliculato, stipulis ovatis oblique acuminatis, coriaceis, cito induratis.

Racemis in axillis folior. superior, 1-1½ pedalibus, multifloris floribus, magnis conspicuis, densis, odore subingrato. Pœoniaceo.

Calycis tubo viridis sepalis aureis revolutis.

Pet. flavis.

Stam. 2 maximis fertilibus petalis 2 infimis oppositis, postico intermedio 3-bus, anticis omnino sterilibus, ovarium deorsum curvatum. Stigma truncatum.

Bractea maxima obovato-concava subcucullata cuique flora, tubo calycis stipita.

Ovarium omnino adnat.

Legumina compressa, suture quaque sublignosa, alis 2 maximus transversis foliaceis crenatis, polysperma.

Hab. In ruderatis humidis umbrosisque Mergue in humidis Moulmein : *Nov.* 1834.

The legumes have exactly the appearance of being formed from two carpellary leaves, the margins of which running outwards from the wings, it is needless to add, that this cannot be the real structure. The leaves according to the Burmese are a specifis for psora.

Hymenia.

Hymenæa courbaril.

Pedicelli crassi in pedunculo articulato, inflorescentia racemoso-cymosa.

Cal. tubo crassissimo ultra medium in sepalis 5, sæpe duorum, vel varia coalitione 3, caducis coriaceis divisus, æstiv. imbricat.

Cor. (no disposition to papileonaceous) ob-petalorum cyathiformis. Petala 5, rotundata sessilia, concava in annulo carnoso, tubo calycis coronata inserta, caduca, pellucido-punctata! æstiv. imbricata, pet. unico intimo sutura dorsali opposito, ideoque vexillum referens.

Stam. 10 annulo inserta supra petala uniseriata.

Filamenta subulata, crassa alba. Anth. versatilis apice subito constrictissima, caduca, æstivat. inflexa et introrsa bilocul. loculis linearibus ad margines, connectivum crassum carnosum reniformum, vasa plura in crescentem disposit.*

Ovarium planum viscosum rubescens, carnoso-coriaceum stipitat. Ovulis plurimis, anatropis, (raphal vessels indistinct, but nearly semi-complete) oblique margo rectus placentiger. !

Stylus filiformis, verrucosulus vel scabrellus, ob. elevationes punct. pellucid.

Stigma reniformia capitat. sinu suture ventral opposit.

A plant with but slight likeness of the family: and remarkable for the fleshy tube of the calyx? and the glandular thick lining, produced above into a thick ring, into which the petals and stamina are inserted as well as for the uniseriate insertions of the stamina, for the articulations of the inflorescence and sepals, for the caducousneis of petals and stamens. (Are these last two peculiarities related to each other?)

The stigma is of the usual Leguminous type, which I take

* Æstivat. of corol. and section of the anther, see, *a*, Pl. DLXXVIII.

to consist of a production of the stigmatic or placental tissue beyond the open end of the convolute leaf, which in this case is united throughout nearly its whole lengt h.

What is the reason why in all this tribe, the stalk of the ovarium is obliquely inserted in the disk and with regard to the axis ? In this, the obliquity is towards the ventral suture.

Can the anatropism of the ovula have any thing to do with the rectembriate embryos ?

The stigmatic canal is choked up with tissue and surrounded by a ring of vessels, derived from several fasciculi crescently arranged at each suture, the sides of the ovary appear to be cellular, its superficies has crowds of glands at right angles.

Most of the pollen is incomplete, water causes the protrusion of fovilla, which on the application of iodine often appears like an extremely long highly convoluted gut, but not so membranous as those tubes produced in other plants by stigmatic action. It appears to have two coats, both very thin, the outer usually like the inner, with 3-5 pores.

A longit. section of the calyx tube, shews a green superficies with which the sepals are continuous, the rest from which all the genitalia and petals proceed, is white.

The vascular supplies pass up between these two, having previously sent off long branches to the stalk of the ovary ; is not this a proof, that the sepals really commence at their articulations ? the so called tube being an excavation of the apex of the axis.

The venation presents nothing peculiar, but is far from being as mentioned by authors, faint.

There is a sort of obliquity apparently in the insertion of the leaflets, owing to which, the smaller or oblique margin is innermost, the reverse of the usual position in the family ? Were it not for this, it might be considered as the first step towards the formation of a Bauhinia leaf, that is, if the leaves of that genus are explainable by the assumption of their being two leaflets, more or less united.

2. *Hymenæa verrucosa.*

Fructus ovoideus, breve stipitatus, stylo basi apiculatus paullo obliquus, suturæ indistinctæ superior distinctior.

Bauhinia.

1. *Bauhiniæ* sp.

Arborea, ramuli teretes velutini, sparsim verrucosi. Fol. basi cordata, foliolis ultra medium concretis dimidio-ovalibus, 5-nerv. subcrenat. breviter pubesc. præsertim infra, supra glaucissima, subargentia. Racemis erectis, pedicellis 1-floris.

Cal. bilabiatim rumpens, sepalis reflexis.

Pet. 5, irregul. longe unguiculata, antico majore vexilliforme plicato-repanda, relique mere repanda.

Stam. fertilia 3, longissima, petalis breviora, deorsum curvata. Anth. lineares versatiles, dorso pilosæ, sterilia 4 filiformia minima, omnia basin 1-delpha.

Ovar. stipitat. stipata inferne calyci adnato. Stylus velutinus. Stigma subcapitat. Legumen 1-loculare stipitata compresso-triangularia.

Hab. In sylvis Moulmein copiosa : *Dec.* 1833.

2. *Bauhinia isopetala*, Gr.

Frutex, ramis flexuosis pubescent. fol. cordata ad medium fere partit. sinu setigero, 9-nervia, acuta reticulata, integra, coriacea subtus pubescent.

Racemis oppositifoliis terminalibus paucifloris, folior. circiter longitudine.

Pedicellis, ad medium bibracteolatis et ad basin 1-bracteat.

Calyce foliaceo hinc fisso.

Cor. maxime regularis petalo quinto antico.

Pet. ovata 1-nervia.

Stam. 10 fertilia basi 1-delpha, subdeclinat. postica minore.

Ovar. longe stipulat. Stylo unciali crasso. Stigma discoid. maxim.

Sp. distinctissima.

Hab. Mergue. Legi etiam Pank Medown Provinceæ Amherst. *Jan.* 1835.

Entada.

Entada arborea, Gr.

Arbuscula, ramulis angulatis, fol. abrupte bipinatis, pinnis subopositis, foliolis pluribus alternis oblongis, basi superne obliquis, subtus glaucis.

Racemis simplicibus axillaribus terminalibusque erectis densifloris, foliis multoties brevior, floribus parvis inconspicuis lutescent. suave odoratis.

Cal. minimus, tubo breviter 5-dentato.

Pet. 5, lanceolata subpatentis, æstivatione valvata.

Stam. hypogyna 10, libera exserta, filam. filiformia complanata. Anth. bilocular. longit. dehiscent. connectiv. ultra antheram in setam, apice glandula rubescent capitat. gerentem producto. Pollen composita ut in aliis Ingis e 12, nucleo central. quadrat. in aqua immersa demum separabilis.

Ovar. cylindricum, stipite brevissimo. Stylus filiformis. Stigma simplice 1-loculare pluri-ovulat. foramen hilum prope.

Hab. Ad margines sylvæ inter Kulwing et Mergue : *Feb.* 1835.

An Entada ? an potius genus novum Entadam et Ingam intermedium ?

2. *Entada* sp.

Frutex longe scandens, foliis bipinnatis pinnis 2 jugis, cirrho bifido, petiole terminat. foliolis 3-jugis, oblongis obovatisve basi supera obliquis, emarginatis.

Spicis longissimis axillaribus vel foliis sæpius in cirrhis

transformatis, Myuriformibus densifloris, floribus parvis primo albidis demum ochroleucis.

Cal. tubo turbinato brevissimo 5-dentato.

Pet. 5 lanceolat. hypogyne staminibus mediantibus in coroll. profunde 5 partit. coalitis æstivatio valvato.

Stam. 10, longe exserta hypogyna, basibus inter se et cum petalorum basibus in corpore carnoso coalitis, filamenta longissima clavato, subantheram abrupte attenuat. Anth. suberectæ biloculi longitud. dehiscent. Connectiv. apice glandula sphæroidea glanduloso-papillosa, stipitat. demum decidua gerente. Pollen simplex. Fæm. rudim 0.

Hab. Mergue. In sylvis ad littoram Ins. Madamaca prope Pator: *March* 1835.

Inga.

Ingæ sp.

Arbor, fol. bipinnatis, foliolis parellogramma ob basin superne obliquis, oblique truncatis, petiolis angulatis, glandula elevata inter pinnularum.

Paniculis patentissimis, floribus minutis, viridescent suaviter odoratis, filam. cupellarib. albis longissimis.

Hab. In sylvis Mergue: *Dec.* 1834.

Desmanthus.

Desmanthus natans, Gr.

Herba perenniis, caulibus cellulosissime natans, pinnis 9-12-jugis, fol. pinnatis, foliolis linearibus, basi superne auriculatis tactu irratibilibus, marginibus rubris supera medium, infra parce pilosa.

Spicis axillaribus, apicibus tantum floriferis, foliis longioribus luteo-viridib. floribus densis.

Cal. tubulosus 5-fidus.

Cor. 5-petala hypogyna, æstivatione valvata, calyce longiore viridescens.

Stam. 10 hypogyna libera. Filam. filiformi longe exserta cellulosa. Anth. bilocul. longit. lateraliterque dehiscentes.

Ovarium sessile. Stylus filiformis, longe exsertus, stigma cavum, 1-loculare, pluri-ovulat. sæpius interdum abortivum. Ovulis 2-seriatis foramen hilum prope.

Floribus a medio infra abortivis, staminib. nempe in corpo-rib. totid. lineari-spathulatis flavis, basi submonadelphis abeuntibus.

Hab. In aquosis Mergue : *Nov.* 1834.

Stam. æstivation alternate longiora brevioreque, hæc sepalis, illa petalis opposita. Bractea colorata lanceolata cuique flora. DC. ait caulibus calloso-cellulosis, quid vult? calyx $\frac{2}{3}$ dentatus, dentibus 2 super minimis, nec 5-dentat. ut etiam ait.

POMACEÆ.

Cratægus.

Cratægi sp. Pl. DLXXII. Itinerary Notes, p. 160 *no.* 821.

Hab. Bootan.

Pomaceæ sp. Pl. DLXXIII. Itinerary Notes, p. 178, *no.* 921.

Hab. Bootan.

ROSACEÆ.

Rosa.

Rosa hetrostyla, Gr. Pl. DLXXIV. Itinerary Notes, p. 179, *no.* 926.

CORIARACEÆ.

Coriaria.

Coriaria nepalensis, Pl. DLXXXV.

OXALIDEÆ.

Averrhoa.

Averrhoa carambola, Pl. DXL. Fig. IV.

Arborea ramulis velutinis fol. impari-pinnatis petiolis velutinis, foliolis alternis ovatis acuminatis, sæpius obliqui-terminali majore.

Paniculis cymosis terminalibus. Pedunculis pedicellisque rubro-miniatis, floribus numerosis parvis purpureis calyce rubro miniato.

Cal. 5-sepalus, sepalis oblongis inæqualibus æstivatione imbricatis.

Pet. 5 hypogyna sepalis alternantia spathulato, lanceolato-reflexa, marginibus basin versus leviter cohærentibus.

Stam. monadelpha nempe basin in cupulam ovarium cingentem coalita, 5 fertilia sepalis opposit. 5 sterilia subulata petalis opposita, filam subulat. Anth. ovatæ bilocul. longit. dehiscent.

Styli 5 filiformia hispida stamina superantes.

Stigmata totidem subcapitat.

Ovarium hispid. acute 5-gonum e carpellis 5 adnatis format. 5-loculare, loculis plano-ovulatis, ovulis 1-seriatis pendulis foramen hilum prope.

Fructus pendulus, inæqualiter 5-gonus lucidus 12-loculares abortient.

Semina pendula, 1-cuique loculo? compressa, arillo cellu-loso omnino obtecto.

Albumen parcum carnoso-corneum. Cotyledones planæ foliaceæ. Radicula teres hilum spectans. Plumula inconspicua.

Hab. Mergue. In sylvis Madamaca: *Oct.* 1834.

DC. Petalorum limbum subrotundum describit. in specimen meo spathulato-lanceolata sunt.

Oxalis.

Oxalis, Pl. DXL Fig. II.

In the common Oxalis of Assam, curious transformations often occur, giving the whole plant, the habit of an Illecebrum or Paronychia.

Several stages are visible on the same specimen, the first of which consists of a metamorphosis of the sepals into leaves, reduced to one lobe or leaflet.

In this case they originate from the same plane. The petals have a tendency to the same transformation, one being more so than the rest. The stamens and carpellary leaves are nearly unchanged, and these last are opposite the shorter stamina which again are opposed to the leaves.

See Pl. DXL. Fig. II. 1-2-3. In these instances similar shaped leaves are often approximated to those resulting from the mutation of the sepals, so that at first sight the calyx appears double, I should observe that in the calycine leaves, there is often a tendency to *lobation*.

In the next stage the whole or the greater number of petals are similarly changed, the leaves being bilobed. The stamina are diminished in size, but their proportions continue the same. The angles of the ovary are more distinct, and the apices of the carpellary leaves are quite so, they are sterile, their margins distinct not glandular and touching the continuation of the axis which is separate: see 4-5-6.

In the next stage, the stamens are more and more abortive: but still there appears no tendency to transformation. The carpellary leaves have become separated and evidently form a verticillus of leaves attached to a short continuation of the axis, their margins are inflexed, or indeed their limbs are conduplicate, their margins are not ovuliferous. The centre is occupied by a verticillus of conduplicate exunguiculate leaves, alternating with the carpellary ones, covered with stiff white hairs. These appear to me to be the rudiments of a second calyx containing the rudiments of the remaining com-

ponent parts of a flower, but of this I am by no means sure, see 7-8-9.

Another stage presents the great elongation of the axis bearing the carpellary leaves which however have no tendency to explanation, some of the second calycine leaves have become petiolate. Beyond this I can say nothing, these leaves however appear to be more irregularly situated: see fig. 10.

With regard to stage, fig. 6, casual examination leads me to imagine, that the calycine leaves developed at a later period, in the axills of the carpellary ones, are transformed ovula.

The most interesting parts of the above imperfectly examined metamorphosis are, the evidently less tendency in the stamina to assume the form of leaves, the decided objection to explanation in the carpellary leaves, and in their axils becoming the nidus as it were, for the attempt at the formation of another flower.

Naga Hills: *March* 10*th*, 1836.

2. *Oxalis* sp. Pl. DXL. Fig. III. Itinerary Notes, p. 149, *no*. 131.

Hab. Bootan.

BALSAMINEÆ.

Impatiens.

Impatiens malayensis, Gr. Pl. DLXXVI. Fig. II.

Herbacea, ramosa, caulibus ramisque pubescent. foliis utrinque attenuatis elongato-lanceolatis argute serratis, subtus ad nervos pubescentib. petiolis pluri-glandulosis, floribus axillaribus 4-5 confertis, calcare subulato obtuso, corollam æquante.

Cal. tetra sepalus biseriatis, seriei externa minimi bracteæformi, interna sepalo postico emarginato mucranato, infera tubulosa in calcar producta mucronata.

Pet. 2, sepalis coloratis seriei interior alternantia, 3-loba, lobis valde inæqualibus.

Stam. hypogyna 5, filamentis complanatis clavatis connectivis carnosis. Anth. cohærentes bilocular transverse apicibus dehiscentes. Pollen oblongum cellulis areolatum.

Stylus brevissimis. Stigma conicum apice 5-fidum antheris, amplexum.

Ovarium pilosum 5-loculare, loculis polyspermis ovulis pendula e funiculo brevi crasso foramen hilum versus.

Æstivatio calycis imbricato.

Each petal is formed of 2, the upper lateral lobe representing one, as is evident from the venation. *a* lower sepal, *b* upper ditto, *c*, *d*, *e*, and *f* smaller ditto, *g*, *h*, larger petals.

Hab. Mergue.

Affinis Balsim. coccineæ sed folia non oblongo-ovalia.

Supposing the flower to consist of 9 parts, the arrangement would be thus: 5 sepals, of which the 2 smaller alternate with the upper and outer sepals, 2 larger with the outer and inferior largest sepal.

Hence the 5th which is wanting, would, if present, alternate with the 2 upper sepals, and be opposite the lower or spurred sepal.

The venation of the upper sepal as it really exists, is however opposed to this, as vascular fascicles exists in what appears to be the line of junction of two sepals, whereas it is a general rule, that in such lines of junction no vessels exist; such is the case in the line of junction of the two petals, which appears hitherto to have been unnoticed, but it is a distinct proof of each petal being formed of two, the venation of the upper sepal is similar to that of the lower spurred one, another objection. If we assume the perianth to be quaternarily divided, it becomes strictly normal, but then the stamina and ovaria are quinarily divided. The stigma is covered by a cellular toothed process arising from the base of the anthers.

2. *Impatiens assamensis*, Gr.

Caulis subspithamæus obtuse angulatus rubro-tinctus.
Fol. alterna ovata vel ovato lanceolata acuminata dentata, dentibus magnis rotundatis sinubus processum subulatum subinflexum gerentibus, subtus saturata viridia, aspectu velutino infra rubescentia sublente pellucido-punctata, venatio insignis, primaria recta, secundariæ basi transversæ, tunc arcuatæ, apicibus convexis, venis transversis paullo curvatis mutuo nexæ, secondariis minoribus pluribus interjectis, dentibus eveniis !

Racemi axiliares longissimi diaphani lutescentes erecti.

Bractea pedicell. quemque fulciens, ovata concava decidua pedicellis filiformibus apice clavatis multoties brevioribus.

Flores progenere parvi lutei.

Sepala lateralia extimaque minima, ovata cuspidata, margine inferiore valde obliquo postico rotundato concavo petaloideo viride tincto subcucullato reflexo antico e 2 connatis maximo ore oblique infundibuliforme late ovato cuspidato in calcar longissime subulatum, obtusum, pedicellum duplo superantem, recurvum vel incurvum product.

Pet. 2, forma valde irregulari sepalum posticum paullo excedentia, lateralia, biloba, lobo postico rotundato crispato, antico lineari longissimo exserto obliquo quoad ejus axin margine superiori subrepando, inferiore rectiusculo.

Stam. monadelpha, tubo elongato sed postice longiore incomplete fisso.

Filam. libera, brevissima filiformia, antica demissius exserta.

Antheræ flavæ cohærentes, basi affixæ, lateraliter dehiscentes. Pollen flavum, oblongo-ellipticum irregulariter areolata. Stylus conicus brevis. Stigma simplex.

Ovarium teretiusculum curvata, 5-loculare, septis tenuissimis facillime ab axin placentisque solutis. Ovula 00 pendentia, oblonga funiculo valde crasso superiore sito foramine hilum prope inferiores et interiore situm.

Tegumentum unicum nucleo adhærens, nuclei ? apex liber, paululum exsertus.

Hab. Assam. Legi specimen unicum ad ripas Burrumpootra arenosus prope Dibong Mookh : *April 4th*, 1836.

Affinis videtur. I. urticifoliæ Fl. Ind. 2, 457.

Sp. Char. Foliis breviter petiolatis, ovatis acuminatis, grosse dentatis sinubus piliferis utrinque glabris, venis tertiariis transversis. Racemis axillaribus longissimis multifloris. Bracteis deciduis ovatis parvis, sepalo postico rotundato reflexo. Calcare longissimo subulato recurvo incurvove, lobis anticis petalorum linearibus longissima exsertis, ovariis 5 locularibus.

Obs. Pollen non areolatum, videtur reticulat. ob granulus contentas maximas, aquæ immersum sub 4-gonum ad angulo uno sæpius hinc boyau exserens. Petala bilobum e 2 connatis oritur ut judicare licet e dispositione vasculorum, venula etiam distincta sinu parellelo currit, hujus ope lobi nexi sunt. Petioli brevi marginati, basi processubus bilobis, lobo superiore subulatis capitatis, inferiore dentiforme. Fig. *i*. Pl. DLXXVI.

Sepalum 5 tum calcaratum anticum, ut patet e positione staminum quæ sepalis opposita sunt.

XANTHOXYLEÆ.

Fagara.

Fagara triphylla, Roxb.

Frutex. Ramuli teretes, ad nodos incrassati novelli compressi glauco-cæsii.

Folia opposita tryphylla, long. $3\frac{1}{4}$—$3\frac{1}{2}$ uncial. lat. $1\frac{1}{2}$ unc. pellucido-punctata petiolus fere 1-2 uncialis, teres apice et basin incrassat : foliolorum petioluli subbilineales supra canaliculata, lamina lanceolata vel lanceolato-obovata subacuta, leviter conduplicata, integerrima subcarnosa, venis secondariis arcuatim nexis, interveniis minute reticulatis, lateralia basi sæpe inæqualia, foliolum terminali paullo majus.

Paniculæ oppositæ axillares, foliis breviores, subcorymbiformes e cymis conflatæ, superiores interdum præcociores pedunculus glaucescens ad nodos incrassat. glauco-cæsius rami inferiores sub 1½ unciales secondarii minute puberuli.

Bractea minute puberula subramulum quemque. Cymæ irregulares, sæpius videntur trifloræ, flore centrali præcociore.

Pedicelli 1½ lineales puberuli, laterales, basi 2-3 bracteolati sæpe videntur umbellulati.

Flores numerosi polygami (numerus nomalis videtur 9, nempe 3, cymæ trifloræ) parvi albi, subodori.

Sepala 4, ovato-rotundata, puberula. Petala totidem punctata, oblongo-rotundata, æstivatione valvata, sublineam longa, initio erecta, cito imbricati-conniventea et clausa.

Stam. 4, alternantia cum petalis, filamenta subulata alba erecta, ante anthesin apice introflexo, per anthesin exserta stricta. Antheræ oblongæ, vel ovales medio-affixæ introrsæ. Pollen albidum, immers. globosum granulosum 1-porosum.

Ovarium lutescens depresso-rotundatum, obtuse 4-lobum, (lobis petalis oppositis) parce pilosum petalis multo-brevius.

Stylus ovario ipso paullo brevior, columnaris 4-sulcatus. Stigma subsimplex minute 4-lobum, inclusum, of two cells, nearly distinct except near the middle, where it is attached to the filament.

Hab. Malacca, in humidiusculis : *Jan.* 1845.

RUTACEA.

Cyminosma.

Cyminosma sp.

Ramuli compressiusculi, albidi. Petioli 5-7 lineales utrinque incrassati, teretes. Folia lamina long. 4-5 uncial. lat. 1½-2 obovata vel obovato-lanceolata coriacea patentia obtusa, interdum subrepanda, supra atro-viridia integra, obscure pellucido-punctat.

Racemi vel paniculæ axillares solitarii vel subaggregati, folii excedenti, pedunculi herbacei, coloris bractea minuta squamiformis sub ramulam et florem quemque. Pedicelli 3-3½ linealis utrinque incrassatiusculi, basi articulati.

Flores minuti viridescentes; toro lutescenti, tetrameri.

Calyx minutus 4-partitus vel potius sepal 4 dentifor. e pedicelli dilatato.

Petala totidem reflexa apiculo inflexo oblongo-ovata æstivatione valvata.

Stam. 8 hypogyna, his sepalis opposita, paullo majora filamenta e basi extrors. curvata erecta, albida, subulata. Antheræ ovato-sagittatæ erectæ mucronatæ, albæ, biloculares basi affixæ.

Torus magnus conspicuus luteus ambitu subcrenulatus placentiformis ovarium extus cingit. et amplectibus.

Ovarium fere toro immersum. Stylus 4-loculare. Stigma 4-lobum, 4-angulat. lobis petalis oppositis. Ovula bina curvis loculo anatropa pendulo appensa.

Obs. The observations of Wight and Arnott in a note regarding the torus seem to me quite correct, the ovary is in fact seated in the shallow hollow of a large disc, but no more than the base is inclosed.

Hab. Malacca Ninghull. *January* 30*th*, 1845.

Paraplexis.

Paraplexis, Pl. DLXXVII. Fig. I.

Drupa exacte globosa, læte coccinea lævissima nitida, magnitudine fructus Ardiseæ ejusdemque coloris vertice vestigio minuto obliterato, stigmatis punctiformis.

Putamen tenue subglobosum osseum, vertice hinc hili situ oppositum, crassiusculum griseo-album. Funiculus putamen hinc adnatus, lateraliter apicem loculi versus currens, infra apicem ad locum crassiorem, putaminis terminans, superne latior, inferne angustior factus.

Semen pericarpia vel putaminis cavitati conforme pendulum. Tegumentum simplex venulosum tenuissimum, pallide fuscum hinc ad hilum foveolatum et secus cursum funicula longitudinaliter sulcatum.

Albumen copiosum cavitatis putaminis conforme album.

Embryo dicotyledoneus inversus, axilis. Radicula teretiuscula, supera, partem superam sub attenuatam, seminis versus spectans.

Cotyledones foliaceæ magnæ cordatæ sub 5-nerviæ, venis anastomosantibus reticulatæ, planæ, subrepandæm. Plumula inconspicua.

Genus formam stigmatis Erythrochiton meo accedens, vix Ternstrœmiaceum.

OCHNACEÆ.

Ochna.

1. *Ochna crocea.*

Arbuscula, stipulis membranaceis, lanceolato-acuminatissimis decidius, fol. lanceolato-acutis, obtusisque serratis serraturis mucronatis.

Racemis terminalibus plurifloris, calycis fructus viride rubro-coccineis, filamentis pluribus persistent. gynobasi maximo rubescente ochroleuco carnoso, hemisphærico, medio stylo apiculat.

Ovaria, plura abortiva vel eorum cicatrices gerente, carpellum tantum maturato oblongo viride, foliaceo, endocarpio coriaceo, an demum osseo?

Semen unicum erectum.

Testa cellulosa fungosa exostomio maximo, fungoso. Embryo inversus, radicula nempe supera brevissim. Cotyledones carnosæ plano-convexæ. Plumula inconspicua.

Hab. Mergue. Ad littoram maris Ins. Madamaca Pator: 1835, fructifer tant.

2. *Ochna lucida.*

Arbor 30-40 pedalis, foliis alternis lanceolatis, lucidis acutis denticulatis, stipulis linearibus erectis, floribus conspicuis, luteis, racemoso paniculatis. Paniculis terminalibus, abbreviatis. Pedunculis sæpius e floris erectis. Pet. 5. Antheris linearibus, terminalibus. Stylo declinato. Stigmato capitato. Carpellis 10. See Fig. VI. Pl. DCV., *a* style and stigma, *b* style detached.

Hab. Ad littoram maris prope Amherst: *Feb.* 1834.

The stigma is not truly capitate, it is subinfundibuliform with repand margins. The styles 10 in number, are united into one column, each of which has an ovate stigma, with thickened margins. It is the aggregation of these that gives the capitate appearance.

The gynobas is nothing but torus, and has nothing to do with the style.

3. *Ochna parviflora*, Gr.

Arbor humilis ramis patentibus, foliis breviter petiolatis, obovato-lanceolatis, acutis glabris denticulatis. Floribus luteis, subumbellatis, ramulorum terminantibus. Pedicellis pedunculis multo longioribus infra medium articulatis. Gemmis ovatis squamosis terminalibus, squamis imbricatis, brunneis marginibus albis.

Cal. 5-sepal. sepalis ovatis obtusis, 2 interioribus paulo minoribus, reflexis, æstivatio quincuncialis.

Pet. 5 subæqualia hypogyna ovata sepalis alternantia caduca.

Stam. 00 libera hypogyna, 3-serialia, seriei externa longiore. Filam. filiformia. Anth. adnatæ? lineares bilocul. longitudinaliter dehiscentes.

Torus paululum elevatus, genitalia gerens.

Carpella 10 circa axim disposita, 1-ovulata, ovulo erecto, stylus filiformis declinatus? staminibus longior. Stigmata plura in capitulum connata.

Flores ante folia evoluti.

Hab. In sylvis prope Moulmein : 1834.

Præcedente differt floribus duplo minoribus, pedicellis ante anthesin cernuis.

Pedicelli pedunculis abbreviatis multo longiores basin versus articulato. Racemi abbreviati conferti umbellam simulantes. Bracteæ setaceæ ad basin cujusque pedicelli.

TAMARISCINEÆ.

Tamarix.

Tamarix dioica, Roxb. Pl. DLXXVII. Fig. II.

Frutex vel arbor, dioica. Rami grisei annulati, annulus lenticelligeris, novelli virides, recentiores brunnescentes, annulis squamigeris, (foliorum exuviis). *a*, *b*, *c* joints, *e*, *d* leaves.

Folia tubulosa, ramos novellos teretes arcte vaginantiæ, obliqua acuminata viridia, demum brunnescentia persistentia, alterna.

Spicæ terminales nutantes cylindricæ undique floribus tecti. Flores basin antica vel inferiore bracteati, bracteis scariosis ovatis acuminatis subcarinatis spiraliter disposita, spira a sinistro ad dextrum versa.

Sepala 5, plus minusve ovalia subæqualia, colorata petaloidea, 2 exteriora subventricosa, quintum posticum, æstivatione quincuncialia.

Pet. 5 hypogyna, oblonga submembranacea, sepalis duplo longiora iisque alternantia, concava, conniventia emarginata persistentia, rosacea.

Stamina totidem hypogyna disci sinubus alternantia et ima basin ibidem coalita, sepalis opposita, exserta. Filam. filiformia, æstivatione flexuosa apice subiter angustata, colorata purpurea, persistentia antherarum post lapsum. Antheræ subversatiles dorso paulo infra medium affixæ, biloculares, loculis fere didymis longitudinaliter dehiscentes, deciduæ æstivatione extrorsæ. Connectivum ultra loculos in processum ob-

tusum planum. loculis breviora product. Pollen ovatum læve, hinc sulcat.

Torus discusve hypogynus intra stamina situs, brunneus carnosus, repanda, 5-lobus, lobis conduplicatis sinubus introrsum proficientibus. Rud. ovar. 0. Florum spica trifaria, *i. e.* when unrolled. In the relation of the spike to the axis the angles of the triangle represent the three rows of flowers.

Fæm. singula postica.

Hab. Assam. Legi ad ripas fluminis Bheræ: *Sept.* 11*th*, 1835. Burrumpootur: *April* 2*d*, 1836.

Obs. In the foregoing description, the leaves are described as sheathing the stem, of this I have great doubts, and if it is the case, a longitudinal section at once shews that the vagina is intimately adherent to the substance of the branch. And yet I think that this, if the joints of the branches be taken into account, is the most rational supposition; a transverse section presents no appreciable difference between the joints and those parts immediately above them. Both are provided with stomata.

The examination of young plants proves, that the leaves are sheathing, and that they are united to the axis, the only difference is in their relative proportion to the points; (which in the young state are not complete,) the proportion between the limb and sheath is reversed in full grown plants, the limb being very small.

SILENACEÆ.

Dianthus.

Dianthus nudiflorus, Gr. Pl. DLXXX. Fig. II.

Planta parvula erecta dichotoma vix unquam spithamæa, articulis tumidis.

Fol. basi conata inferior patento-reflexa, superiore ascendentia, omnia lineari. sed hæc angustissime.

Flores solitari in axillis et subsessiles, axill. altera ramul. gignent.

Calyx basi induratus textura omnino coriaceus cylindraceus ⅔ uncialis ratione plantæ longiss. dentibus 5 longis acutissimis, venoso-striatus.

Pet. 5 cum sepalis altern. ungue longissimo longitudine calycis, lamina minima bifida, patens, post anthesin erect. marginibus arcte involutis rubro-carnea, basi pilis paucis erectis, coronæ rudiment. gerent. secus centrum coloris ruber saturatior. genitalia inclusa. Pet. imo basi inter se cohærentia, stamen basi altius cohærent.

Stam. imo basi in annul. concret. inæqualia. Filamentis capillaribus, petalis paullo brevior. Anth. bilocul. membranaceæ. Pollen poris pluribus.

Ovar. oblongum parietibus tenuibus ad apicem ovarii incrassatis, uniloculare. Placenta linearis flexuosa, ovula pauca anatropa, pendula et ascendentia, 2 summa semper? pendula. Tegment. cum nucleo accretum, apex second in globos. projectum.

Stylo 2, capillacei long. Stigma decurrens, e papillis secus sulcam centrali dispositis, papillis apice majus congestis.

Albumen transverse curvat.

Habitus quodammodo Pladeræ certe Silenaceus, et forsan Diantho propinque.

Hab. Affghanistan. Barren rocky mountains Otipore : *April*, Itinerary Notes, p. 354, *no.* 132.

Obs. The relative proportion of the calyx to the corolla etc., during their earlier stages is enormous, the former being nearly perfectly formed when the latter are very minute.

The whorls of the floral series are remote, the corolla and stamen arising from above the base of the calyx, and the ovarium being stipitate.

The stamina and styles are evascular, the petals have 3 veins, all of which are prolonged into the the lamina. Can the two *gibbers* on the base of each lamina from which the hairs arise and which are evidently distinct from each other and

seated on the lateral veins, be referred to two additional series of stamina?

From comparison with one species of Dianthus, it is scarcely distinct except in the want of the involucra, which is not universal in Dianthus? and the presence of the hairs on the base of each petal.

ERYTHROXYLEÆ.

Erythroxylon.

Erythroxylon burmanicum, Gr.

Arborea, ramulis compressis divaricatis, foliis alternis breviter petiolatis obovatis emarginatis integris marginib. cartilagin. glaberrimis subtus glaucis. Stipulis lanceolato linearibus membran. deciduis, gemmatione folia involventibus ; florib. 2 in axillis, inconspicuis, albis, pedicellis folio multo breviorib. clavatis angulatis basi bibracteolatis.

Cal. 5-sepalus, dentibus ovatis.

Pet. 5-sepalis alternanto reflexo, basin versus, appendice erecto petaloidea.

Stam. 10 basin versus in cupulam truncata ovario paulo breviorem coalita. Filam paulo intra cupulam exserta, petalis longiore subulata inæqualia. Anth. biloculares long. dehiscentes.

Styli 3 staminibus breviores. Stigmata 3-capitata.

Ovarium 3-loculare, loculis 1-ovulatis, ovulis pendulis. Pericarpium baccatum calyce persistenti tuboque stamin. demum in adelphis 3-4 fissis, stipatum. Endocarpio osseo, 3-loculare 1-sperma, dehiscentia septicida. Albumen carnosum. Cotyledones planæ, plumula inconspicue, radicula infera? Section of the ovarium. Fig. III. Pl. DLXXXI.

Hab. Mergue. Ad littoram Madamaca : *Aug.* 1834.

MALPIGHIACEÆ.

Hiræa.

Hirææ sp. Pl. DLXXXI. Fig. IV.

Frutex scandens volubilis, floribus ante folia evolutis racemoso-paniculata inconspicua albidis. Racemis pendulis.

Fol. juniora opposita ovato-repanda parce ferrugineo-pubescent. pilis adpressis medio affixis.

Cal. inferus, 5-6 sepalus.

Pet. totidem iis alternant. lanceolata obtusa hypogyna patentia.

Stam. sepalis numero duplo libera hypogyna, alterna paulo longiore sepalis opposita, filam. sepalis brevia imis basibus connata. Anth. terminales membran. biloculares longit. introrsumque dehiscent.

Styli 3, filiformes longiuscule exserti. Stigmata 3-capitata.

Ovar. e carpellis 3, dorso orbicularib. lateribus nempe in alam orbiculare expansis, medio carinatis, 1-locularibus, 1-ovulatis, ovulis pendulis, foramen superum hilum prope.

Calyx fructus deflexus, filam. olim persistent. fructus, e carpellis 3, complanatis, dorso carinatis, orbicularib. nempe in alam maximam medio foliaceis venosis ampliatis. Stylis stigmatibusque persistent. coronatis, 1-spermis. Radicula supera Cotyledones planæ. Genus distinctissime.

Hab. Tenaserim Provinces. Ad littoram Insulæ Tavoy : *April*, 1835.

Char. Stipulis rudimentariis binis minimis inter petiolaribus utrinque, ramulis compressis ferrugineo-pubescent.

HIPPOCRATEACEÆ.

Salacia.

1. *Salacia prinoides.*

Fruticosa scandens, fol. oblongo-lanceolatis obtuse acuminatis, coriaceis, lucidis subserratis floribus axillaribus densissime confertis.

Pedicellis filiformib. petioli citciter longitudine.

Pet. concava suberecta, annulo 0. Stigmata simplice filam. basibus carnosis ovario adnatis. Ovar. loculis 2-ovulat. ovulis superpositis.

Hab. Legi ad margines sylvar inter Kulweng et Mergue. Ordo male definitus. In quibusdam epigynosis vera accedit. ob stamina cum ovario acereta. *Jan.* 1835.

2. *Salacia myrtifolia.*

Scandens fruticosa, glabra, fol. oppositis vel suboppositis, breve petiolatis elliptico-oblongis, coriaceis integerrimis, supra atro-viridis, floribus minutis viridibus odoratis in axillis conferte aggregatis. Pedicellis filiformib. petiolos excedent.

Cal. 5-sepalus, sepalis ovatis inæqualibus, æstivatione imbricat.

Pet. 5-hypogyne ungue lato, suborbiculare patentia, sepalis alternantia, æstivatione imbricat.

Stam. 3, interdum 4, basibus in cyathum ovarium arcte cingente connatis, ideoque primo aspectu vere epigyna videntur.

Filam. libere brevia, complanata.

Anth. biloculares transverse dehiscentes extrorsæ.

Ovar. 3-loculare, loculis pluriovulatis ovulis angulis interioris affixis, foramen conspicuum hilum versus. Stylus breviss. Stigma capitatum.

Genus notu dignum, urceolus staminifer ad basin in annu-

lum elevatus. Ovarium ad apicem trigonum angulis staminibus alternant. Pollen læve longit. sulcatum.

Hab. In sylvis. Ins. Madamaca : *Dec.* 1834.

Obs. If the genus be distinct it may be called Epignandra.

3. *Salaciæ* sp.

Frutex ramis laxis, subscandentibus, fol. oblongo-lanceolatis subacuminatis coriaceis glabris, obsolete obtusque serratis floribus in axillis aggregatis, plurimis inconspicuis luteis. Pedicellis filiformis petiolos subæquant. basi bracteatis.

Cal. 5-partit. basi peltat. laciniis ovatis ciliatis æstivatione imbricatis.

Pet. totidem suberecta nec patentia ovata concava inæqualia, subhypogyna.

Torus staminifer carnosus rotundatus, vix angulat. ovaria ambiens occultansque.

Stam. 3, libera, filam. membranacea complanata. Anth terminales extrorsæ biloculares, loculis subdidymis transverse dehiscent. Pollen læve oblongum hinc sulcat. filam. demum et ad dehiscentia, antherarum extrorsu revolutæ.

Stylus brevissimus sub 3-gonus. Stigma capitat. minutum.

Ovarium 3-loculare, seminiferum ob medium inferum toro accretum ideoque stamen vere epigyna, loculis 2-ovulatis, ovulis superpositis, angulo interiori loculare affixis et subascendentibus, foramen hili prope. Fig. 2, Pl. DLXXXII.

Gen. Hippocrateæ pentandræ accedit, toro exannulato et a character ordineo ovario toroque semi-accretis discedit. vide Sal. tortuosa in quo ovarium cum toro $\frac{1}{4}$ concretum, ordo forsan genera altera complectans.

Hab. In sylvis arbusculorum. Mergue vulgo: *Dec.* 1834. An Salacea Prinoides. Wight and Arnott's Prod. flor. Ind.

4. *Salacia tortuosa*, Gr.

Fruticosa scandens, glaber ramulis elongatis filiformibus, compressis divaricatis, fol. ovato-elliptica obtuse breveque acuminata, subserratis supra lucidis, subtus reticulat. Cymis axillarib. oppositis, dichotomis, petiolis duplo longioribus dichoto-

mis plurifloris, floribus inconspicuis viride lutescent. pedicellis subuncialibus filiformibus.

Cal. 5-sepalus, sepalis rotundatis plus minus ciliatis.

Pet. 5 oblonga obtusissima reflexa, marginibus submembranaceis, hypogyna, annulus elevatus integerrimus inter petala staminaque.

Stam. 3 libera extrorse. Filam. brevissima apice tori inserta. Anth. biloculares, loculis transversim sitis et transversim quoad axin, vero longitudinaliter dehiscent. cellulosæ. Stylus brevissimus. Stigma integra subcapitat. obtusum.

Ovar. toro accreta ideoque infera 3-loculare, loculis 2-ovulatis, ovulis ascendentib. superpositis foramen hilum prope.

Ramulorum basibus 1-tortis scandens, an species toro in annulum elevato generis distincta omnia Salacia mystifolia. Section of ovarium &c. Pl. DLXXXI. Fig. II.

Hab. Mergue. In sylvis prope Kulweng: *Jan.* 1835.

Hippocratea.

Hippocratea pentandra.

Arbor 3 5 pedalis, trunco albo demissius e ramoso, ramulis compressis, foliis oppositis rarius alternis, oblongo-ovatis obtusis, integris repandis glabris ; floribus paniculatis albis subodoratis.

Paniculis solitariis in axillis, aggregatisve (potins ex ima basin ramosis) pubescente velutinis folia sæpe excedent.

Pedicelli pedunculorum ramulis multo tenuioribus, discoloribusque basi minute bracteatis.

Cal. 5-fidus, dentibus ovatis.

Pet. 5, suborbicular perigyne. Torus 5-angularis complanatus angulis calycinis laciniis oppositis.

Stam. 5, 2-3 abort. filam. e medio angulorum libera facta, complanata subulata. Anth. biloculares longit. lateraliter dehiscentes introrsæ.

Stylus 0. Stigma capitat.

Ovarium apice 3 gonum, basi toro arcte ambient. cinctum

occultumque 3-loculare, loculis 4-ovulatis, ovulis ascend. binatim collateralibus, foramen hilum prope.

Hab. Mergue. In sylvis densis et ad littoram Ins. Madamaca: *Dec.* 1834, etiam ad summit Collis Pator.

Obs. Stam. fertilia numero varia interdum omnia abortiva floribus interdum 4-fidis. Petal. vere perigyna. Ovaria basis toro accreta.

Omnia Hippocrateæ, stam. 5 exceptis, stam. ante anthesin introrsa per anthesin subextrorsa, filam. dien persistentia, alabastra complanata.

2. *Hippocratea angulata*, Gr. Pl. DLXXXI. Fig. I.

Caulis ramique viridis 4 angulato cicatricibus bruuneis, fol. supra saturato-viridia, subtus albida.

Alabastra fusco tincte. Flores viridescenti alba.

Hab. In rupibus, Loonkaram kha, Journey from Assam to Ava, *March* 17*th*, 1837.

Delvi Nempean : *March* 19*th*, 1837.

3. *Hippocratea serrata*, Gr. Pl. DLXXXII. Fig. I.

Frutex scandens.

Ramis cinereo-brunneis, ramulis compressis brunneis.

Foliis suboppositis, concavis, suturato-viridibus costa venisque lutescentibus, subtus pallidioribus, floribus subumbellatis aureis, suave odoratis.

Journey from Assam to Ava. Tsakan Delvi : *May* 8*th*, 1837.

EUPHORBIACEÆ.

Fluggea.

Flüggea Leuopyrus.

Dioica suffrutex humilis, ramis alternis, spinis terminatis.

Folia alterne obovato obcordata integerrime glabra breviter petiolata.

Flores in fasciculis axillarib. aggregati.

Masculi numerosissimi, virescentes redolentes, pedicellis capillaribus floribus longiorib.

Fæminei pauci, pedicellis duplo brevioribus. Fructus baccatus, pisi magintudinis, albi.

Masc. Perianth. 4-5 sepalum non verticillatum? sepalis irregularibus, subfimbriatis. Cor 0.

Stam. 4-5 sepalis opposita. Filam. exserta filiformia. Anth. biloc longitud. dehiscent. Gland. hypogynæ 5, filamenta interjectis, inter stamina et petala sitæ. Rudimentum ovarii 0. Styli tres, et stigmata tria.

Fæm. Perianth, ut in mare. Rudiment stam. 0. Cupula glandulosa, glandulis nempe concretis, ovarii basin cingens.

Phyllanthus auctorum.

Phyllanthi sp. Pl. DLXXXIV. Fig. I.

1. Female flower front view.
2. Do. lateral.
3. Male do. front.
4. Do. posterior.
5. Do. long ½ section.
6. Sepal with its scale detached.
7. Column of stamens.
8. Cells of inner membrane of anther.
9. Pollen.
10. Ovarium.
11. Do. transverse.
13. Capsula.
14. Do. upper end, shewing the excavation.
15. Do. transverse.
15*a*. Seed.
16. Do. long section.
17. Do. transverse.

Gen. novum monent. Cl. Wight. *Arcot* 1832.

2. *Phyllanthi* sp.

Ramules flexuosi, teretes, viridi, novelli utifolia rubro-tincta.

Fol. subdistantia alterna, petioli sub 3-lineales, supera canaleculata stipulæ ovato-acuminatæ supera medium petioli basi cohærent. inæqualia. The smaller ones are all on the same side of each branch, lamina lanceolato-oblonga acuminata, integra subcarnosa, glabra $3\frac{1}{2}$-$4\frac{1}{2}$ long. 10-13 lineas lata; V. secundariæ utrinque conspicuæ obliquæ, subtus V. tertiariis anastomosant. connexæ.

Flores monoici mas. et fæm. aggregati in axill. inconspicui. Pedicelli mascul. graciles, sub 4 lineal. fæm. crassiores, breviores. Perianth masculum fuscescens, e sepalis 6, biseriatis oblongis, a medio reflexis, æstivat. apice leviter imbricatis.

Columna stamina sepalis interior paullo brevior, oblonga. Antheræ sepalis oppositæ magnæ lineares, extrorsæ, apex 6-lobus immersus. Pollen granulosum albidum, 3-plicatum, an interdum 5-plicat. Rudim. fæm. 0.

Per. fæm. sepala erecta carnosa magis herbacea subovata, breviora, stam. 0.

Ovarium parce pilosiuscule subrotundum, sepalis duplo brevius stylus luteus columnaris, crassus apice paullo magis incrassato 6-fido, fissuris emarginatis, sepalis triplo longior, textura stigmat. propria 0? vel vix conspicienda. Ov. 6-loculare, ovula pendulo-appensa collateralia, foramine supero.

Inner tissue of style very conductive of a congeries of boyau-like tubes.

Fructus capsularis basi perianth cinct. subplacentæformis, apice depresso e centro columnam axserente 12-sulcatus sub 6-lobus, lobis sepalis alternis, loculicidim 6-valvis (valvis sepalis oppositis) centro carinatis. Endocarpium osseum distinctum dorso dehiscens, semina bina angulata coccinea includens. Semina appense tegument externe

baccatum processu intrante magno, interne subosseum. Embryo albus, radicula brevissima supera. Cotyledones ovales.

Obs. The seed is not equilateral, the inner side of the tegument being much thicker, so that the embryo is thrown to the other side; and as this is convex, it becomes slightly curved in consequence. See Pl. DLXXXIV. Fig, V, *a* hilum, *b* baccate tissue, *c* embryo.

3. *Phyllanthi* sp.

Frutex dioicus ramis subangulatis, ramulis brevibus sulcatis, fol. parvis oblongo-ellipticis subtus glaucis, stipulis ovatis subfoliaceis floribus parvis inconspicuis in axillis aggregatis, ochroleucis.

Mas. Per. infundibuliforme turbinat. pedicello nempe apice dilatato limbo 6-fido, laciniis interdum emarginatis. Squamæ 6, laciniis oppositis, eorumque basibus inserta. Stam. monadelpha, tubo incluso. Anth. 6 adnatæ 2-loculares, longit. dehiscentes. Pollen globosum læve.

Har. Inter fruticis, Mergue : *Jan.* 1835.

Fæm. nondum vidi.

Staurothyrax.

Gen. Char. Mas. Per. 4-sepalum, sepalis ovat. concav. æstivatione imbricatis. Gland. hypogynæ 4, sepalis alternant. Stam. 4 libera, hypogyna, sepalis opposita.

Fæm. Per. ut in mare, glandulæque. Ovarium 4-loculare ! loculis 2-ovulat. Stylus ad basin 4-partit. laciniis dichotomis. Stigmata 8 linearia. Caps. baccat. 4-locul. loculis cruciatim dispositis.

Inflorescentio vel fasciculato racemosa et tunc e ramis nudis orta, vel fasciculata in axillis foliorum.

Stauros et *thylax Gk.* ob fructus loculorum dispositionem cruciatam, 1835.

1. *Staurothylax* sp.

Arbuscula dioica, floribus masculis capitulato-racemosis, racemis aggregatis 3-4 in apicibus ramorum, floralium peren-

nantum? l-squamatorum, floribus in pedicellis filiform. numerosis, fusco-rubescent minutis.

Per. 4-sepala, sepalis ovatis concavis, æstivation imbricatis 2 exterior.

Glandulæ hypogynæ, ovato-oblongæ sessilea, sepalis alternantes.

Stam. 4 libera hypogyna, sepalis paulo breviora sepalis opposita. Filam. filiformia extrorse curvata. Anth. bilocul. membranaceæ, loculis lateral dehiscent *subextrorsæ*. Connectivum minimum, flores etiam in axillis foliorum junior. aggregat. Inflorescentia nuper descripta nuda in ramis.

Inflorescentia fæminea ead. axis sæpe producta, foliosque minus colorantum. Per. ut in mare patentissima, glandulæ ut in mare. Styli breviss. profunde 4-partit. laciniis ad basin fere partit. Stigmata 8 linearia subsimplicea.

Ovar. 4-loculare! loculis 2-ovulatis.

Capsula baccata, immatura angulis rotundis 8-4 locularis, loculis cruciatis, pluribus nudis foliis ad apices ramor. confert. post authesin evolut. pseudo pinnatis ovatis acutis integris subtus glaucis, stipulis parvis ovulis apicibus sphacelatis. Ramulis flexuosis.

Hab. Circa Mergui: culto ob fructu, "Gooseberry tree" of Madras. 1834.

Ovar. 4-loculare, (Sec. Ov. Pl. DLXXXIV. Fig. VI.) et stylo 8-partito stigmatibusque 2, a congeneribus distinct.

Athroisma.*

1. ***Athroisma serratis*, Gr.**

Arbor 28 pedalis, monoica, ramulis junioribus floriferis, Foliis juniorib; lanceolatis, serratis subobtusis, mucronatis, luteo albis stipulis lanceolat. membranaceis brunneis, vernatio involutiva, spicis masculis terminalis, densifloris, floribus minutis luteo-viridescent. fæmin. virid. vel axillaribus et solitariis in axillis folior. summor. vel ad basin spicarum.

* *Athroisma Gk.* acerous.

Mas. flores aggregati, in axillis bracteæ ovatæ pilosæ. Glandula oblonga carnosa viridis foveolata, utrinque bracteæ. Pedicelli exserto.

Per. cyathiforme, sub 3-dentat. ciliatum, dentib. subconnivent.

Stam. 3 hypogyna. Filam. filif. Anth. bilocul. exsertæ loculis discretis longitud. lateraliterque dehiscent. Pollen ovat. hinc sulcat.

Fæm. Per. 3-sepalum, sepalis virid. ovato-lanceolat.

Styli 3. Stigmata totidem elongata apicibus racemosis.

Ov. 3-loculare, loculiis 1-ovulatis, ovulis pendulis, foram. conspicuum hilum prope. Pl. DLXXXV. Fig. IX.

Fructib. subglobosis verrucosis pendulis, foram. conspicui hilum prope. Endocarp. crassis osseum. Caps. 3-locularis, 3-sperma. Sem. pendul. testa coriacea carunculo parvo. Cotyledones plano convexæ. Rad. supera, plumula inconspicua.

Hab. In humidis ad ripas fl. Tenasserim etiam Mergue.

2. *Athroisma dentatis*, Gr.

Frutex, monoicus ramulis cinereis teretibus.

Foliis alternis stipulatis inæqualibus lanceolatis acuminatis, repando-dentatis basi biglandulis, aliis maximis longe pedicellatis 1½ spithamæus ; stipulis minimis setaceis deciduis.

Racemis paniculatis terminal. bracteatis, (bracteis linearibus) breviter pilosis elegantibus, floribus masculis albidis in pedicellis 2-articulatis elongatis tenuibus filiformibus.

Cal. membranaceis cellulosus, 5-6 sepalus, sepalis inæqualibus.

Cor. rotata. Pet. 5-6 obovata sessilia, sepalis alternantia cellulosa tenerrima.

Glandulæ hypogynæ 5, subreniformes, petalis alternantes tubique staminei basin circumdantis.

Stam. 3-4 bilocul. vel 6-8 1-locul. in tubum coalita. Anth. subsessiliæ longit. dehiscentes, si bilocul. tunc didymæ.

Fæm. Cal. 5-sepalus, sepalis ampliatis, inciso-ciliatis, ciliis apice glanduliferis, viridi ruber, glandulæ ciliarum sanguineæ.

Pet totidem iis alternantia brevioreque inæqualia? masculis conformia.

Glandulæ obsoletæ 5-sepalis opposita ovarii basin stipant. Ovar. rotundatum, 3-lobum. Styli 3, patenti breves. Stigmata 2 cuique stylo capitata. Ov. 3-loculare loculis 1-ovulat. Pl. DLXXXV. Fig. IV. *a*, chalaza *b* secundine, *c* foramen.

Hab. Mergue. In sylvis, collinis densis, Madamaca: *Nov.* 1834. Proordine frutex elegantissima, floribus masc. nutant. tremulis.

Diplomorpha.

Diplomorpha herbacea, Gr.

Radix videtur fusiformis. Herba glabra prostrata vel decumbens.

Caules flexuosi angulati, angulis membranaceis.

Folia altern. elliptico-ovata, succulenta, 1-nervia, mucronata, subserrulata, breve pedicellata, glauca, margine discolori.

Stipulæ 2 acuminatæ ad basin petioli et squamulæ stipuliformes ad basin cujusque ramuli.

Inflorescentia axillaris, flores monoici, masc. in axillis foliorum inferior, fæm. superiorum exorti, masc. plerumque bini, albo rubro leviter tincto.

Pedicelli gracilis ad eorum basis bracteæ plures, fæm. virescentes, pedicellis minus gracilibus.

Masc. Perianth 1-seriatum gamosep. sepalis 6 usque ad medium concretis, apicibus incurvis crenatis, intus 6-squamis iis oppositis paulo minoribus stipatis. Glandulæ 0.

Filam. in columnam brevem concreta ad apicem antheras 3, bilocul. longitud. dehiscentes gerentia. Pollen angulare, angulis lineis albis notatum. Rudim fæm. 0.

Fæm. Perianth. biseriatum, 6-sepalum, sepalis usque ad basin discretis, planis acuminatis, 3 exterioribus major. 3 interiorib. minorib. Gland 0. Rudim stam. 0.

Ovarium turbinatum, 3-angulatum 3-loculare, loculis bio-

vulatis. Styli 2 quemque loculo. Stigmat. simplicia. Ovariis maturantis parietes loculorum seorsum ita creseunt ut stylos multo superant. Primo aspectu pericarpium ut in Resedam videtur margo cavitat. 3-angularis, ejus fundo styli visi sunt. Pericarp. 3-coccum, coccis dispermis semina testa rugosa, 3-angular hilo satis magno. Albumen carnoso-oleosum. Embryo curvatus. Radicula supera, cotyledonibus planis.

Obs. Novum genus constituit. Phyllanthio omnino dissimilis hoc charactere notandum. Flores monoici.

Masc. Perianthium gamosepalum, 1-seriat, sepalis usque ad medium concretis. concavis squamulis oppositis suffultis. Stam. monadelpha. Anth. 3.

Fæm. Perianth 6-sepal. biseriat., sepalis 3 exteriorib. majorib. 3 interiorib. minorib. planis. Styli 6. Pericarpium ad apicem cavum, 3-coccum, coccis dispermis.

The name refers to the difference of form in the flower of the sexes, from *duplex*, et *forma* Gk.

Bridelia.

1. *Bridelia rhamnoides*, Gr.

Cal. tubo brevissimo 5-partitus, laciniis ovatis patentibus.

Pet. 5 minima sinubus dentium calycinam inserta, ungue brevi carnosa, limbo bifido, crenulato repandoque, annulus glaudulosus luteis intra pet. staminaque calycis faucem obclaudens.

Stam. hypogyna monadelpha sepalis opposita. Filam. libera brevia subulata. Anth bilocul. Rud. fæm. 3-lobum stylo brevi terminat. tubo staminei apice insiden.

Fæm. nondum vidi, arbuscula, dioica? ramulis verrucosis ferrugineo-pubescentibus, foliis breviter petiolatis lanceolatis integris utrinque pubescent, subtus glaucis, floribus axillaribus capitatis, minutis. Pet. alba, annulo aurantiaceo inflorescentia centrifuga, ideoque composita, stipulis linearib. luciduis.

Hab. In sylvis Mergue : *Oct.* 1834.

2. *Bridelia alnifolia*, Gr.

Arbuscula monoica ramulis ferrugineo-pubescent. fol. breviter petiolatis oblongo-obovatis, basi subcordatis, obtusis utrinque præsertim subtus pubescentib. floribus in pluribus axillis confertis subsessilib. inconspicuis.

Cal. 5-partit. laciniis patentib. ovatis acutis, viridescens maculis sanguineis.

Pet. minima vix unguiculata, calycis sinubus inserta repando sinuata alba maculis rubris urceolus glandulosus obsolete 5-lobus, intra pet staminaque lobis sepalis oppositis!

Stam. 5 monadelpha, sepalis opposita. Rud. fæm. ad apicem insidens.

Flores masc. in centro capitulor. fæm in ambitu, tardius florescentes.

Fæm. cal. et corolla urceolusque ut in mare sed basin ovarii, having reached supra in cupulam marginibus incisis inflectitur. Styli 2-fida connatis stigmato 4 papulosa.

Ovarium 2-locul. loculis 2-ovulatis, ovulis pendulis.

Hab. In humidis Mergue : *Oct.* 1834.

Ejusdem generis cum præcedente.

3. *Bridelia urticoides.*

Arbuscula ramulis vetustioribus nudis verrucosis junioribus teretibus angulatisve verrucosis viridibus alterne foliosis.

Fol. breviter petiolis lanceolat. acuminat. subintegra subtus subglauca brevissimaque pubescent. superne atro-viridia nitida, stipulis linearibus membranaceis brunneis, caducis.

Inflorescentia vel nuda vel axillaris glomerulata, floribus minutis numerosis, albido-rubescentibus, odoratis, odore Heliotropiceo.

Glomeruli androgyni, floribus utriusque sexus sine ordine mixtis, fæmineis primo florescent.

Fæm. Cal. extus pubescens, tubo subturbinato, 5-partit. laciniis ovatis, patentis subacutis.

Pet. totidem quot sepala minima squamiformia ovato-integra dentatave sinubus calycinis inserta.

Discus perigynus carnosus (margine annulata elevato annulataque,) intus super ovarium producta, ideoque fere omnino occultans.

Stylus filiformis 2-partitus. Stigmata 2 oblonga cuique laciniæ, longe exserta. Ovar. ovulum glabrum 2-loculare, loculis 2-ovulatis, ovulis pendulis, foram. super hilum prope.

Mas. Per. ut in fæm. Pet discusque ut in fæm.

Stam. 5 monadelpha, stipit. ovar. abortientes adnata. Anth. biloculares, longit. dehiscentes. Rud. ovar. central. inter stamina.

Hab. Mergue. Ad littoram Ins. Madamaca: *Dec.* 1834.

Croton.

Croton Tiglium.

Arbuscula, fol. ovato-lanceolatis acuminatis integris glabris, stipulis viridibus apicibus patentibus floribus in axillis aggregatis, viridi lutescent. pedicellis basi bracteatis, petiolis brevioribus.

Mas. Pedicelli filiformes. Per. corollinum 6-sepalum biseriatum, seriei externa majori, sepalis ovatis patentibus.

Stam. 6, monadelpha in tubum brevissima unita, connectivum ultra anther. breviter product. Anth. adnatæ, bilocules longit. dehiscentes.

Rud. fæm 0, æstivat. valvata.

Fæm. Pedicelli clavato. Per. calycinum 6-sep. biseriata, seriea externi multo majore sepalis erectis. Rud. stam. 6, stylus brevis. Stigmata 5, conniventia sub triangularia lutea emarginata.

Ovar. loculi tot quot stigmat. 2-ovulat. ovulis per totam longitud. placentis adnatis ideoque non vere pendulis foramen hili apicem. Pl. DLXXXIV. Fig. IV. *a. b.*

Hab. In humidis sylvis, Mergue: *Oct.* 1834.

The apex of the nucleus, projects out in the shape of a clavate filament. capsula rotundata stigmatibus coronata 10, stricta, 5-cocca, coccis 2-spermum.

2. *Croton* sp.

Arborea monoica, foliis longe petiolatis cuneati-obovatis ovalibus cordato-ovalibusve inæqualiter serratis, 5-nerviis, basin prope utrinque 1-glandulosa. Racemis terminalibus, bracteatis multifloris, masculis racemorum apices versus disposita, tardius expansis, fæmin. basin versus, citius.

Fæm. Cal. 5-partit. laciniis patulis. Cor. 0, Styli 3, bifida, stigmata 6, elongata. Capsula obtusa 3-gonum, 6-sulcatum extus punctatum, stylorum 1 reliquus coronat. pubescentia stellaris adpressa, aspera, 3-loculare, loculis 1-spermis, seminib. pendulis ab apice loculorum.

Mas. Cal. ut in fæm. laciniis reflexis. Cor. 5-petala. Pet. spathulatis reflexis villosis. Stam. circiter 1-4, filamentis liberis ima basin villosis. Anth. bilocul. longitudine et lateraliter dehiscentes.

Foliorum juniorum serraturæ glandulosæ pergynæque brunneo-rufescentis. Stigmatæ æstivat. convoluta.

Hab. In humidis Mergue, an culta, *Sep.* 1834.

Rottlera.

Rottleræ sp.

Arbuscula dioica, ramulis petiolis, pedunculisque ferrugineo-velutinis, foliis ovato-deltoideis acuminatis longe petiolatis subtus candidis, venis ferrugineis.

Racemis paniculatis, terminalibus vel in dichotomis ramulorum pendulis.

Fæm. Cal. 3-partit. ovarium papulosum, papulis albido-velutinis demum in corporib. subulatis productis. Stylus breviss. stigmata 3-papillosa, ovarium 3-loculare trifidus loculis 1-ovulatis, ovulis pendulis.

Mas. Inflorescentia paniculato-racemosa.

Sepalis ovatis patentibus extus breviter tomentoso velutinis. Stam. 00 libera hypogyne. Filam. subulata, Anth. ovatæ biloc. long. dehiscent. Rud. fæm central minimum mere spatum nudum.

HAB. In sylvis Mergue frequentur: *Sep.* 1834.

ALEURITES.

Aleurites sp. Pl. DLXXXIV. Fig. III.

Arbor mediocris, fol. alternis exstipulatis longe petiolatis e basi deltiformi-cordato bi-glandulosis, ovato-acuminatis integeris glabris, basi 5-venii, 2 lateral. indistinctis.

Fructus pauce in racemis raminis, in pedunculis ligneis robustis, viridibus pomi magnit. without any conspicuous marks or furrows, etc.

The fruit has certain indications of 4-valvular lines outside.

Substance fleshy disposed to be baccate, bilocularis dispermi seu abortu unispermi. Endocarp. fibroso-coriaceum spongiosum, tela (Testa ?) interjecta inter id. et semen. The vessels are between the fibrous and spongy parts.

Semen erect lateri interior magis planum, subreniforme ossea durissima apice *mammillo*-ossea crassa, lined by a thin cellulo-papery layer.

Albumen copiosum carnosum. Embryo radicula brevis supera. Cotyledon foliaceis planis venosis Plumula conspicua.

Semen habitus Euphorbiaceus.

a Embryo, *b* fibrous coat, *c* cellulo-spongy ditto, *d* drupaceous very hard ditto, *e* like torn paper, *f* albumen, *g* hilum, *h* drupaceous coat, *i* third ditto, *j* chalaza, *l* hilum, *m* raphe, *n* chalaza, *p* mycropyle, *o* drupaceous coat.

OBS. I believe the fibrous coat which easily separates into 2 shells longitudinally, belongs to the fruit, that the seed is pendulous; the spongy coat beiug testa marked above by a large hilum.

Evidently Euphorbiaceous.

TRAGIA.

Tragia, Roxb.

Monoica scandens, pilis pungentibus hispida, foliis cordato-ovatis acuminatis serratis, stipulis foliaceis cordato-acuminatis.

Racemis oppositifoliis bracteis infimis lanceolatis reliquis linearibus, floribus viridibus inferior fæmineis, superior masculis, fæmineis multo majoribus.

MAS. Perianth. tubo brevi 3-partitum, laciniis latis æstivatione valvatis.

Stam. 3 distincta, laciniis alternantia hypogyna filam tubo longitud. clavata, viridia, in apiculam inflexam, filamenta facie introsa incumbente producta. Anth. bilocul. Connectivum viride.

Fæm. per 3-phylla, sepalis, cordato-ovatis acutis imbricatis! Ovar. 3-gonum, extus pilis hispida stylus 3-fidus, laciniis viridibus carnosis intus papillos virides (stigmata) gerens, 3-loculare, loculis 1-ovulatis, ovulis pendulis.

HAB. Mergue. Culweng in fruticetis scandens, succo lacteo fætæ.

Genus distinctissima. Per. fæm. 3-sepal, imbricatum maris gamosepal valvatum præcipue nota dignum.

EXCÆCARIA.

Excæcaria, Pl. DLXXXIII.

1. Part of male spike.
2. Male flower, outer view bractea removed.
3. Inner do.
4. Posticous petaliform body.
5. Right lateral do.
6. Left lateral do.
7. 8. Bodies seated on the glands: 7 the right, 8 left.
9. Pollen.
10. Female flower outer view.
11. Do. inner.

12. One of the bodies seated on the lateral glands.
13. Fruit nearly ripe.
14. Ovulum attached, with part of the axis and its cellula cap.
15. Cap datached composed of elongated cells.
16. Section of the testa shewing its opening, the secondine is entire.
17. Section of the secondine.
18. Nucleus.

Excæcaria affinis.

Arbor. 40-50 pedalis, ramulis junioribus viridibus teretibus, Petiolis 2-uncialibus, canaliculatis, rubescent, basibus quasi pruriosis, stipulis caducis ex cicatricibus angustatis.

Fol. alterne ovalibus basi subcordatis mucronato-acuminatis, penninervis, nervis secondariis distinctis infimis utrinque ad mediam 1-glandulosis, supra læte viridib. subtus glaucis, floribus racemoso-paniculatis, lutescent.

Paniculis divaricatis terminalibus. Bractea ad basin cujusque floris et utrinque corpus glanduliforme subreniforme areolatum.

Pedicellis pluribus in axillis bracteæ aggregatis, basi 1-bracteolatis, articulatis.

Perianth cyathiforme irregulariter dentatum. Pet. 0.

Stam. 2 hypogyne ima basin 1-delpha, exserta, filam. crassa longit. perianth cellulosa. Anth. didymæ longit. lateraliterque et utrinque dehiscentes, margo dehiscent, pulchre rubra. Pollen luteum oblongum læve hinc sulcatum.

Fæm. nondum visa.

Affinis Excæriæ.

Hab. Mergue. In sylvis cum *Athroisma dentata. Nov.* 1834.

Flores minutissimi suaviter odorato

Excæcaria agallochum.

Dioicea. Arborea, foliis petiolatis lanceolatis ima basin 2-glandulosis, acuminatis crenato-repandis. Petiolis canaliculatis late marginib. diaphana coriaceis glabarrimis.

Inflores. mascula spicata, spicis axillaribus, solitariis petiolis longioribus odoratis fæmineis etiam spicatis, spicis petiolorum longitud.

Mas. flores solitarii in axillam bracteæ cordatæ reniformi. Bractea utrinque glandulis carnosis viridibus stipata.

Stam. 3, quorum inferius anticum longius monadelpha, tubo staminea brevo. Per. 0. sed cococsus. corpora 2 carnosa bipartita, lacinia 1 multo majore, altera, subalata.

Corpora ejusdem generis inter filamentorum quorum superum posticum minus. Filam. subulat. Anth. biloculares, Fæm. bractea ut in masc. Stylus breviss. Stigmato 3, **Fructus 3-coccus, coccus 1-pyrenis.**

Fæm. Cal. fere ut in mare e corporib. 2 glandulis insidentibus. Cor. vel Per. 3-sepalum, sepalis 2 lateralib. 1-majore antico supero. Stylus brevis, stigma 3-revoluta, capsula 3-cocca, coccis 2-spermis.

I should observe, that these petaliform bodies vary much in shape, and that the above account as well as the figures agree with that which I have observed to be the most common form.

Hab. In aquosis Mergue : *July*, 1834.

Char. Generus. Inflorescentia utraque spicata, floribus solitaris in axillis bractearum carnosarum utrinque basin versus glandulis stipatarum.

Mas. Per. 2-sepal. sepalis, lateralibus forma irregulari glandula insidentibus, dextro plirumque basi bi-glanduloso, sinistro 1-glanduloso. Stam. 3, basin versus in tubum concreta. Filam. filiformia. Anth. didymæ connectivo aliquando ultra antheram producto. Corpora 3, petaloidea diffor-mia in sinubus filamentorum, quorum superum (anticum) stamina longiore postico oppositum 3-lobatum. dextrum bilobat. sinistrum sub integrum. Pollen leve, sulco longitudine.

Epiprinus. *Nov. Gen.*

Epiprinus malayanus Gr.

Ramuli (petiolisque) brunnescenti puberuli, teretes robusti.

Folia alterna, conferta. Petiol. 3-uncialis, teretes, utrinque incrassat. lamina ampla e basi cordata ovata, cuspidata acuminata 8-uncial. long., lat. 4-unc., subtus puberula, scabrella basi biglandulosa sub 5-venia, integriusculum, v. secundariæ arcuatim nexæ, v. tertiariis transverse convexæ, inter venulis reticulatis.

Inflorescentia axillaris, racemi paucæ ex axile fol. major. superior, plures ex axillis folior. multo minorve, fere subsessilium.

Racemi vel paniculæ pedunculi robusti carneo-tincti minute puberuli vel furfuracei erecti subdigitales.

Fl. infra medium fæmineis distantes, supra medium (*vel ramulorum*) masculi dense congesti.

Bractea sublanceolata patens vel subreflexa, carnea vel lurida, utrinque basis glandula coccinea subfl. fæmin. quemque 1-bracteolæ 2 minores concolores basin versus pedicelli clavati 2 lineales.

Perianth. biseriatim, exterius e foliolis bracteolis similibus sed longioris magis carneæ erectæ ; interius fol. per junior similes lanceolato-acuminatæ, duplo majores, dorso secus centram conspicue costat. griseæ, dorso carneo-tinctæ, interiorum marginibus reflexis.

Stam. etc. 0.

Ovarium parvum subtrilobum triloculare. Ovula solitaria, pendula foramine supero, process. placentæ obtecto.

Stylus robustus basin supra tripartibus, ramis cito palmatim divisis, intus stigmatosa materia badio-papillosa tect.

Ovar. stylusque pilis e basi ob conica fascicul. dense velutinus.

Fl. masculi sordidi rufescenti grisei glomerulati (sub glomerulos bractea carnea acuta, carinata) centrales ve terminales præcociores, sessiles. Per. valvatum cupuliforme, ad medium 4-partitum, lacin. semi ovates.

Stam. 8, filamentis longis, æstiv. a medio inflexis, infra flexura lilacinis vel purpurascente, supra albidis, ad anther.

capillaceis longe exsertis. Antheræ magnæ lutea, cohærentes, oblongæ, basin prope affixæ, pubescenti-pilosæ bilocular. longit. lateral. dehiscentes. Pollen sub ovatum glabum triporosum obscure.

Rudimentum ovarii trilobum.

Hab. Ching, Malacca Nhinghull: *Jan.* 1845.

Obs. This is among my first collection in fruit, but it was not examined; it is surrounded by a foliaceous perianth.

I see nothing approaching to it in Endlicher's Genera, and the characters are so well marked, that it is not a genus likely to have been so imperfectly characterised as not to be recognisable.

BURSERACEÆ.

Boswellia.

1. *Boswelliæ* sp.

Arbor humilis ramulis verticellis plurimis stomatiformibus, petiolis par folioliorum inferiorem subtus, supra planis, foliolis inpari-pinnatis ovatis vel lanceolatis, acuminatis, lateralibus sæpius obliquis. Paniculis terminalibus et axillis foliorum summorum pallide ferrugineis, floribus numerosis albis.

Cal. parvus 5-sepalis.

Cor. rotata basi fere 5-partita, laciniis lanceolatis æstivatione imbricatis. Petala 5, disco hypogyno inserta.

Stam. 10, disci inserta margine exterior. Filam. complanata subulata pilosa, alterna petalis opposita breviora, Anth. erectæ biloculares longit. dehiscentes. Discus glandulosus pilosus ovarium basin ambiens.

Stylus piliformi-crassus. Stigma discoideo-capitat.

Ovarium pilos. $\frac{1}{4}$ inferum basi nempe disco coalit. biloculare, loculis 2-ovulatis, ovulis ascendentibus foramen margine conspicu. Section of the ovary Pl. DLXXXV. A. Fig. II.

Hab. Mergue. Ad litttoram Ins. Madamaca vulgatim: *March*, 1835.

It is an exceeding long time between the 1st appearance of the buds and expansion of the flowers, about 4 months. The disk is *not* perigynous.

2. *Boswelliæ* sp.

Arbor foliis pinnatis.

Cal. sepala 5 ima basin fere distincta, ovata.

Cor. 5-pet. petalis unguiculata, hypogyna, sepalis alterna, patentia.

Stam. 10 subdiscum hypogyna ovarium cingens, 10-crenulatum inserta, 5 sepalis, 5 petalis opposita. Filam. subulata. Anth bilocul. longitud. dehiscentes. Stam. 5 sepalis opposita demissius, 5 petalis oppositis superne disco inserta.

Ovarium 3-locul.

Sem. 4-6-8 in quoque loculo, ad apicem in membranam alæformem. Cotyled. crassæ carnosæ punctatæ ; radicula brevis superam product.

Hab. Prope Trichinopoly.

Canarium.

Canario affine.

Ramulis subteretibus, novellis ferrugineo puberulis. Folia alterna pinnata subpedalia 2-3 juga cum impari. Petiolus subspathamæus. Foliola oblongo ovato petioluto subbilineales cuspidato-acuminata integra long. $4\frac{1}{2}$ $5\frac{1}{2}$ uncial, lat. 2 uncialia.

Paniculæ terminales foliis paullo brevior, pedunculus brunnescens angulatis, sulcatus. Flores racemosi vel subcymosi minuti, viridescentes, (pedicelli breves vix lineales) extus minute subpuberuli.

Calyx carneo tinctus subobconicus ad medium tripartitus.

Corolla e petalis totidem cordato. rotundatis vel obreniformibus imbricatis, aliqoties majoribus calyptratim secedentibus (an semper ?)

Stam. 3 sepalis opposita, paullo sepalis longiora. Filamenta brevia, basi in annulum carnosum brevem coalita vel inserta; plerumque cum 4to. Connectivum dilatatum subovatum, intus loculiferum, loculi 2, longitud. dehiscentes Rudimentum. Pistilla tridentatum in centro annuli filamentorum.

Fl. Hermaph—?

Fructus basi calyce cinctus pedicell crassiusculum, clavatum terminans obliquissimum, subreniformis compressum, plumbei coloris et cereus subdiaphanus infra apicem styli base breviter mucronat., basi lateri superiore gibbosus, caro firma, cellulosa tenuis pyrena subossea tenuis.

Semen 1 lateri inferiore prope, stylum affix. conforme.

Tegumentum simplex albidum, tenue. Cotyledones carnosæ, biplicatæ. Radicula supera, (i e hilum prope.)

Hab. Malacca Ching. Malacca Nhinghull: Mr. Lewis informs me that in some of the islands of the Indian Archipelago a species of Canarium yields all the oil used by the inhabitants. *Jan. 27th,* 1845.

Obs. In one instance I observed a tendency to develope all the parts of the ovarium: *i. e.* fruit, in æqual-trilobus. This can scarcely be a species of Canarium, and it does not come near any other of the characters.

The small number of stamina is not of much consequence, but the shape of the fruit is different.

RHAMNACEÆ.

Zizyphus.

1. *Zizyphus jujuba.*

Arbuscula ramis flexuosis hinc ad basin petiolorum aculeatis, aculeis rectis subdeflexis junioribus breviter pubescentibus.

Fol. petiolatis ovalibus ovatisve serratis obtusis, basi ob-

liquis, 3-nervus, nervis lateralibus extus conspicue penninervus, cæterum obscuris junioribus subtus niveo, senioribus ferrugineo-tomentosis floribus racemoso pallide citrinis.

Racemis axillaribus, abbreviatis multifloris.

Cal. 5-partitus, extus rubescens, laciniis ovatis sinubus calycinis inserti patentibus.

Pet. minora sepalis alternantæ cuneata, subcucullata.

Stam 5 petalis opposita cum iis inserta.

Discus epigynus obsolete 10-lobus.

Stylus crassus brevis, Stigmata 2, Ovarium 2-locul. calyce adnatum, loculis 1-ovulatis, ovulis ascendentibus. Radicula hilum prope.

Æstivatio valvata, serratis plicato-conduplicata.

Culta obfructum, Moalmain Mergue: *October* 1834. Uti omnes plantæ quæ ubiquæ cultæ sunt magnopere variat.

2. *Zyzyphi* sp. Pl. DLXXXV.

Frutex subscandens, cortice brunnea ramulorum novellorum fusco-viridis, spinis brunneis, foliis supra saturata viridibus subtus subglaucescentibus, floribus a petalis viridi-lutescentibus.

Hab. Patakaye mounts Moolumboo Delvi: *March 27th*, 1837.

Ventilago.

Ventilago sp.

Fruticosa longe scandens. Fol. alternis bistipulatis, stipulis ovatis membranaceis minimis deciduis, petiolis brevibus rubescent. fol. ovat. oblongove ovatis emarginatis obtusissimis integris glabris reticulatis.

Racemis paniculatis, axill. et terminal.

Calyx fructus discoideus truncatus demum marginibus crassis, fructibus, oblongis foliaceo-alatis, ala quoad cavitata semenifer maxima ovata 1-nerv. rubescent. nervo medio,

marginibusque lutescent. basi 2-locular. loculo 1, sæpe abortient. 1-ovulat. ovulis erectis, foramen hilum prope.

Semina globosa vel si bina hæmisphærica. Embryo minutus in excavationem basilari. Radicula brevis infra hilum spectans. Cotyled. foliaceæ orbiculatæ. Plumula inconspicue, albumen carnosa copiosum. Pl. DLXXXV. Fig. III. *a*, dark coloured vascular lines, *b* albumen, *c* vitellus.

Hab. Mergue. In sylvis collinis Palor: *Feb.* 1835.

Gouania.

Gouania leptostachga.

Scandens, subglabra.

Foliis alternis petiolatis (petiolis canaliculatis) cordato-ovatis, obtuse acuminatis late crenatis, supra atro-viridibus lucidisque, infra pallidis et ad nervos pubescens.

Racemis subpaniculatis longissimis nutantibus pubescent. floribus numerosis, parvis albis, 2-4 fasciculatis in pedunculo brevissimo odoratis, *odore prussico,* in pedicellis brevissimis articulatis.

Cal. tubo brevi, limbo 5-partito, ovario longe adnato persistente? laciniis leviter subpatentibus æstivatione valvatis.

Pet. 5 minima cucullata, sinubus calycinis inserta, stamina obtegentia.

Stam. in annulum 10-dentatum calyci adnatum unita, dentibus 5 petalis oppositis antherif. 5 oppos. sepalis, sterilibus, oblongis emarginatis. Filam subulata brevia, Anth. biloculares subversatiles, loculis longit. dehiscens. Pollen leve. Styli 3 brevia filiformia. Stigmata totidem obtuse pupillosa.

Ovaria infern. nempe tubo calycina adnat 3-loculosa, loculis 1-ovulatis, erectis foramen hilum versus. Long. and transverse section of ovarium &c. Pl. DLXXXV. Fig. II.

Cirhi longissimi ex apice ramularum *pedunculi transformat.* stipulis minimis membranaceis. Discus epigynus

ad faucem calysis in annulum denticulat. stylus subamplectens clavatis.

Hab. Mergue. In Sylvis Ins. Madamaca: *Oct.* 1834.

Rhamnus.

Rhamni sp. Pl. DLXXXVI.

Frutex scandens, cortex ferruginea, fol. subtus glaucescente supra saturati-viridia, 1-venia subtus subtiliter punctulata. Ramuli viridescentes. Flores viridescentes fortiter sed subingrate odorata.

Hab. Patkaye mountains. Vix occurrit infra alt. 3000 pedum.

AURANTIACEÆ.

Obs. In Ægle marmelos. *Bel*, the septa have *pellucid* or glandular dots: the funicle arises from an irregular areola, situated near the inner angle.

In Murrya exotica the stamens are not inserted into the *disk*.

Limonia.

Limonia sp. *nova quoad.* D. C.

Arborea, foliis lanceolatis in petiolum apicem articulatis, acuminatis obtusis repandis glaberrimis pellucido-punctat.

Floribus viridescentibus odoratis paniculatis, paniculis axillaribus folior. circiter longitudinis, dichotomis corymbosis.

Cal. minimus, 4-partitus.

Pet 4 linearia sepalis alternantia apicibus cucullatis, deciduis.

Stam. 8 libera biserialia seriea externa sepalis *opposita* paullo longiora. Filam. petalis paulo breviora subulata basibus plana ciliataque. Anth bilocul. longit. dehiscentes.

Torus luteus clavatus angulis 10, staminib. oppositis, ad apicem pilosum.

Ovarium pilosum, stylus brevis filiformis, stigma subcapit. sub 4-lobum, 4-loculare, loculis 2-ovulatis ovulis superascendent. inferiore majora pendulis, foramen hilum prope. Fructu maturescent. torus disapparet loculis amplis factis ovulis minimis. Endocarp. separatum.

Pedicelli paulo infra medium bracteat. Pl. DLXXXVI. Fig. II. section of ovarium with ovules.

Hab. Mergue. Ad littoram. Ins. Madam.: *August*, 1834.

Citrus.

Citrus scandens, Gr. Pl. DLXXXVII.

Frutex spinosus scandens. Spinis *ramulinis* vel inflorescentibus et tunc minoribus.

Ramuli petiole, et folia pubescentia.

Flores albi, uti stamina, suave odorata. Petala extus medium supra viridi tincta.

Hab. In sylvis collinis near the Serpentine Mines versus Burmam.

April 3rd, 1837.

Species disctinctissima. Ord. Assamia superiore raro occurrens: in vallem Mogoung frequenter, specias quatuor legi versus Serpentine mines.

Glycosmis.

Glycosmis quinqifolia.

Frutex ramis laxis, fol. pinnatis pinnis alternis, (vel 3 foliatis), oblongo-lanceolatis, subacutis, irregulariter subserratis senioribus subintegris pellucido-punctata.

Paniculis cymosis axillaribus terminalibusque foliis brevioribus rubescente velutinis, cymis sub 3-chotomis paucifloris, floribus inconspicuis albis subodoratis.

Cal. 5-sepalis, sepalis ovatis rotundatis minute brunneo. pubescent. æstivatione imbricatis.

Pet. sepalis alterne obovato, punctulata, æstivatione imbricatis.

Stam. 10 libera, subbiseriatis, 5 externa paulula longiore sepalis opposita. Filam. complanata. Anth. ovatæ basibus sagittatis affixis longit. dehiscent. Connectiv. glandulos. glandulaque terminat. Pollen oblongo-ovatum læve hinc sulcatum.

Ovar. stylusque crassiss. filiform. glandulis elevatis punctat. Stigma truncat. subcapitat. 5-sulcat. medioque foveolat. Ovar. toro albido paulo elevat. insidens 5-loculare, loculis 1-ovulat. ovulis pendulis foramen hilum prope.

Hab. Mergue. In sylvis. Kulweng: *Dec.* 1834.

Character Wightianus bonus.

Cookia.

Cookiæ sp.

Suffrutex ramulis viridibus, foliis impari-pinnatis, foliolis alternantibus, ovatis terminali magis lanceolato-acuminatis crenato-repandis, pellucido punctatis, floribus paniculatis, inconspicuis viridibus.

Paniculis terminalibus divaricatis.

Cal. 5-sepalis, sepalis minutis.

Petalis 5 caducis glandulosis ovatis suberectis concavis.

Stam. 10 libera, alternatim brevior, brevioribus sepalis oppositis. Filam. sepalis breviore basibus dilatata sub 3-angularia, superne subulata, partis dilatatæ marginibus inter se leviter cohærentia. Anth. basi affixæ bilocul. longit. lateraliterque dehiscentes. Pollen aureum oblongum hinc sulcatum.

Ovarium toro parum clavato-insidens, obsolete 5-lobum, stylus crassus viridis filiformis, stigma capitata obsolete 5-lobum, 5-loculare, loculis 2-ovulatis, ovulis pendulis collateralibus foramen ad apicem conspicuum.

Æstivatio pet. imbricata, 1 exterius, 1 interius. Pl. DLXXXVII. Fig. II. *a* inner-most, *b* outer-most petal, *g* sec-

tion of the ovary and style, *f* portion of placenta with ovules attached shewing them to be collateral, *c* foramen, *d* raphe, *e* chalaya.

Hab. In sylvis. Mergue: *Nov.* 1834.

Bergera.

Bergera Kœnigii.

Arbuscula, fol. alternis impari-pinnatis; foliolis oblique lanceolatis acuminatis crenato-serratis, secus nervum medium sub pubescent. Corymbo terminali multifloro, folioloso, floribus albis.

Cal. brevis, 5-partitis basi incrassatus. Pet. totidem, oblonga sepalis alternantia.

Stam. 10 distincta alterno longiora sepalis, alterna breviora petalis opposita, distincta, toro dilatato carnoso inserta. Anth. bilocul. erectæ. Stylus crassus. Stigma capitatum, transverse sulcatum.

Ovar. 2-loculare, apice non ovuliferum sed receptaculum olei utrinque continens. Ovula 1, interdum 2 cuivis loculo, pendula nec peritropa. Tegumenta bina. Pl. DLXXXVI. Fig. III.

Hab. Bengal. Prope Jumalpore: *Sept.* 17*th*, 1835.

Obs. Genus Murrya vix distincta.

Aurantiaceæ sp.

Arbuscula vel frutex ramis laxis, foliis oblongo ovatis, obtuse cuspidatis, integris pellucido-punctatis, axillis foliorum inferior spina recurva (vel pedunculo vel ramo abortivo) gerentibus.

Ramulis petiolis, foliorum nervo medio, infra, foliisque junioribus infra, ferrugineo-paleaceis, foliis alternis obovatis obtusis, subintegris coriaceis irregulariter pellucido-punctatis, floribus axillis aggregatis, pedicellis foliis brevioribus.

Cal. æstivatione imbricata 5-sepalis.

Pet. 5. Stam totidem petalis opposita. Anth. bilocul. cingentia. Stylus brevis. Stigma capitat. Ovar. 5-loculare? loculis 1-ovulatis, ovulis ascendentibus.

Fructibus longe pedicillatis ovatis stipitatis toro nempe elongato, apice parce pilosis, glanduloso-punctatis, baccatis, 1-spermis semen pendula in materia *aquosa* resinosa viscosa indulans. Cotyledones carnosæ. Plumula polyphylla? ulteruis examinanda. Pl. DLXXXV. A. Fig. XIV.

Stipite calyce, 5-sepalo stipato (sepalis patentibus rotundatis emarginatis), basi cicatrisata.

Baccæ 1-spermæ 1-locul. vel 3-spermæ 3 locul. an plures? seminibus pendulis. Cotyledonibus carnosis, plano-convexis, apicibus bifidis! Radiculo supera brevissima. Plumula inconspicua. Pl. DLXXXVII. Fig. III. *a*, radicle, *b* junction of cotyledon, *e* ditto other face, *d* seed externally.

Vidi tantum flores longe ante anthesin, stipulis 0. Habitus Myrsinearum.

Hab. Ad littoram Ins. parvæ prope. Pulo Gewen: *Nov.* 1834.

CEDRELACEÆ.

Ixonanthus.

Ixonanthus sp. Pl. DLXXXIX. Fig. II.

Semen rarius perfectum pendulum, solitarium, funiculo quasi, maxime irregulariter monstrosum, supra in subulam apicem loculi attingent. product: infra irregulariter lobatum, lobis apicem versus punctulatis subsaccatis, ovula quodomodo mentientibus.

Semen brunnea oblongo-lanceolatum, raphe pallide ½ completa insignit. compressiusculum, chalaza subdepressa.

Albumen carnosa. Embryo thrown out to the external border of the seed.

Cotyledones foliaceæ.

Plumula inconspicua testa coriaceæ, tegumento interius tenuiss. albumen arcte vestiens, tela cellulosa distincta irregulariter interjecta inter tegumenta. *a* attachment of funicle, *b*, *c*, ovule, *d* albumen, *e* testa, *f* embryo, *g* funicle, *h* hilum.

MELIACEÆ.

Melia.

1. *Melia excelsa.*

Arbor excelsa 50 pedalis, trunco gracili albo altius ramoso.

Fol. ad apices ramorum confert. pinnata 2-2½ pedalia, petiolo tereto, basi versus incrassata, foliol. alterna vel subopposita, oblonga acuminata, basi superne, obliquissima, et subauriculata, repanda, nitida læte virentia glabra, subtus reticulata penninerva.

Paniculis axillaribus, 2-pedalibus, interdum foliolis, compositis subthyrsoideis, floribus in cymis paucifloris dispositis inconspicuis parviusculis albidis. Subodorat. Pedicellis basibus articulatis bracteatisque pedunculisque pubescente velutinus.

Cal. 5-sepalus, sepalis velutinus rotundatis subæqualibus.

Pet. 5, oblongo-linearia patentissima obtuse, pubescent., æstivatione imbricata, 2 exterior, 1-interiora. 1-intermedia.

Tubus stamineus basi dilatat. 10-sulcatus, sulcis basi subdistantibus, membrana interpositis, supra approximatis, ideoque filam 10, basibus dilatata inter se per totam longitudine coalita, apice sub 15-dentat. dentibus petalis oppositis latioribus integrisque, sepalis oppositis, plus minus profunde emarginat.

Anth. subexsertæ oblongæ sessiles bilocular longitud. lateraliter dehiscentes. Pollen globosa læve, aqua immersa papillus 2-3 emittens (Onagracious).

Stylus crassius filiformis media supra papillos. Stigma subconica basi annulat. 3-4 lobum papillosum, annulus carnosus

hypogynus, ovaria basi cingens. Ovar. glab. 3-loculare, loculis 2-ovulatis ovulis pendulis collateral. foram. superum hilum prope. Pl. DLXXXV. Fig. V. single ovules attached to the Placenta.

Gen. discedit. ovaria 3 nec 5 loculare.

An Melia excelsa Jack, sed charactere DeCandollii erroneus

Hab. Circa Mergue, an culta : *Dec.* 1834.

2. ***Melia azadarachta.***

Arbor. Folia pinnata, dimidiato-ovatæ, acuminata, grosse dentato-serrata, ad apices ramorum conferta.

Inflorescentia axillaris terminalisque, racemoso-paniculata. Flores albi redolentes bracteata, bracteis caducis. Æstiv. corol. imbricat.

Cal. 5-sep. sepalis ovatis.

Cor. 5-pet. petalis lanceolatis sepalis alternis patentibus stamina hypogyna, biserialia, sepalorum numero duplex.

Filam. in tubum coalita. Tubus ad apicem 10-lobus, quorum 1 cuique antheræ respondit, lobis 5 exterior sepalis, 5 interior petalis oppositis. Antheræ ad apicem tubi, longitud. et introrsum dehiscentes.

Stylus 1 tubo stamineo brevior filiformis. Stigma subtræformes. Ovarium 3-locul. loculis 2-ovulat. ovulis pendulis.

Obs. Development. The younger the bud is, the less is the development of the tubus stamineus and style compared with that of the anthers and stigma. In a bud, in which the corolla is double the length of the calyx, the anthers are very large, the lobes of the tube small, not reaching half way up the back of the anthers, while the tube itself scarcely exceeds in length the anther. The stigma is well developed but almost sessile.

Hartighsea.

Hartighsea ramiflora.

Ramuli subsimplices elongati inferne floriferi, superne foliosi, novellæ partes cum fol. nascent. ferrugineo-furfurac.

Folia petiolata 1-1½ pedalia, petiolis angulatus foliola in petiolulis bilineal. supra canaliculatis, alterna, sub 11 oblongo-lanceolata, superiore lateri inæqualia obtuse cuspidato-acuminata supra atro-viridia, long. 4½-5 uncial, lat. 1½ uncial.

In the lowest leaves of the axiles, a short raceme sometimes occurs.

Racemi florum ex axillis folior. lapsor. vix ultra unciales, (all at the same state of development) pedunculis infra medium quasi lignosus, squamis brunneis bracteatis notat. parte florifera viridesceus ferrugineo-puberula.

Pedicelli sublineales versus medium articulati bractea brunnea squamiformi suffult. Bracteolæ 2 minimæ concolores.

Flores densiusculi 4-meri, majusculi, ochroleuci, cito fuscescentes.

Calyx minimus planiuscula, 4-dentatus.

Petala 4, lineari-oblonga, ad medium tubo staminum erect. et cum leviter adhærent. tunc reflexo-patentia, 4-linealia long. 1¼ lat.

Tubus stamineus petalis paullo brevior, pressione subangulatus, subtetragonus, apice dentibus 8 latis brevibus subemarginatis interdum. Antheræ oblongæ, parvæ sessiles in dentium facie interiore, bilocul. longit. dehiscent. Tubus interior triplo brevior crenulatus, crenul. forsan 10, cum antheris altern. ovarium cingens et æquans.

Ovarium brevissime stipitatum subglobosum lepidotum minutissima.

Stylus filiformis vel columnaris, prope basin articulatus longitudine circiter tubo staminei, apicem cyathulo brevi ampliat. Stigma discoidea subexsertum e cyathulum

supra dictum prominens. Ov. triloculares, ovula bina pendula collateralia, anatropa.

Fructus. ?

Hab. Malacca Nhinghull : *Jan.* 27*th*, 1845.

Obs. Hartighseæ sp. ? sed foliola non opposita, a tendency to an additional tooth in the staminal column. Column or tube very veiny, the principal axes corresponding with the anthers, along which the tube is also outwardly sulcate, the staminal fascicles appear simple. The inner tube is evascular.

The structure of the apex of the style and stigma render it probable, that this latter texture may be highly exserted.

Monosoma.

***Monosoma littorata*, Gr.**

Arbor. Foliis pinnatis 2-jugis, ramis 1-jugis, foliolis obovatis, vel ovato-obovatis obtusissim : coriaceis integris, penninerviis, nervis secondariis suboppositis, subtus pallidior reticulatisque (fol. aliquando abortu solitariis). Petiolulis brevibus crassis brunnescent.

Inflorescente paniculato axillaris. Paniculis pauciflora foliis brevioribus pedunculis pedicellisque clavatis rubescent, floribus inconspicuis viride albidis subsuaviter odoratis.

Cal. 4-sepalus, sepalis orbicularibus minimis.

Cor. 4-petala, petalis sepalis alternantia obovato-oblongis, concavis, patentibus, æstivatione imbricatis.

Stam. 8 monadelpha, hypogyna in tubum apice 8-dentat. (dentibus ovulibus apiculatis) connata. Anth in sinubus dentium sessiles, biloculares introrsæ longit. debiscent.

Ovarium rotundat. miniatum apice tantum viridescente. Stylo brevi filiformii. Stigma discoideum brevissima conicum, subspiraliter 4-sulcatum. Ov. 4-loculare, basin versus solidum ; loculis pauci-ovulatus, ovulis pendulis ab axin central. apicem loculorum versus, foramen inconspic. hilo obversum ideoque loculi fundum versus spectans. Pl. DLXXXVIII. Fig. III. Transverse section of the ovary &c.

Pl. DLXXXV. Fig. VIII. longitudinal ditto.

Fructus maximus, 1-locularis pericarpio crasso leathery, sub 4-valvis. Semina pauca maxima, angulata. Testa crassissima, extus coriacea intus, suberosa. Albumen 0. Cotyledones, maximæ carnosæ, in corpus unicum coalitæ. Radicula subsupera? maxima, testæ cicatrici notat. facili germinans.

Ad littoram Insular. et inter Rhizophoreus circa Mergue copiosa. Florens *Nov.* 1834, fructu, *July*, *August*.

Habitus floresque Meliacearum, a quibus cotyledonibus cavitatam tantum differt.

Char. Gen. Cal. 4-sepalus. Pet. 4 patentia, stam. in tubum monadelphum apice 8-dentatum coalita. Anth. sessiles in sinubus dentium. Ovarium 4-loculare, loculis pauci ovulatis, ovulis pendulis, stylus 1, stigma peltatum subspiraliter 4-sulcatum. Fructus maximus, 4-valvis, 1-locularis. Semina plura maxima angulata, cotyledones coalitæ.

Guarea.

1. *Guarea oblongifolia.*

Arbor humilis, fol. 2-jugis, petiolis basin petiolulisque incrassatis rubescent. foliolis oblongis obtusis, basi obliquis plus minus, subtus reticulatis.

Paniculis axillarib. foliis multo breviorib. Floribus inconspicuis albis.

Monos. littoratæ affinis.

Ad littoram Ins. Madamaca: *Feb.* 1835.

2. *Guarea disyphonia*, Gr.

Arbor 30 pedalis, fol. pinnatis 2, 3 jugis, foliolis sæpius oppositis oblongis lanceolatisve oblongis subrepandis, atros virid. venis secondariis distinctis obtusis petiolis verrucosis basi dilatatis.

Pauiculis axillaribus compositis longissimis 1½ pedalibus

pendulis. Pedicillis articulatis brevibus basi bracteatis, floribus majusculis albis.

Cal. 4-dentata, dentibus acutis.

Cor. 4-petala, pet. lineari-oblonga, medium infra conniventia, corollamque gamopet. simulam, med. supra reflexam distinctaque, æstivatione valata.

Tubus stamineus petalis paulo brevior, extus pubescens apice sub. 8-dentata denticulataque. Anth 8 sessilis intra tubam paulo infra apicem bilocular. longit. dehiscent. dentibus tubo oppositis. Pollen subglobosum læve.

Columna hypogyna carnosa, stamino tubo duplo brevior 8-dentato, dentibus sepalis alternant. longe pilosis ovarium intus pilosissima omnino obtegit.

Stylus filiformis. Stigma, discoid. 2 annulat. annulo interior minore albo, 4-sulcato.

Ovar. pilosum 4-loculare, loculis 2-ovulatis ovulis ascendent, superpositis foram superia. Pl. DLXXXV. A. Fig. I. *a* annulus exter, *b* ovula in situ with a portion of placenta.

Hab. In sylvis. Ins. Madamaca prope Palor : *Dec.* 1834.

An Guarea sed character generis magnopere deficiens : ob tubos duos, quorum interius sterili. Disyphonia nominanda.

3. *Guareæ* sp. Pl. DLXXXVIII. Fig. II.

Fructus pomi magnitud. stipitatus, stipite crass. $\frac{1}{4}$ unciali ; lutescens, apice cruciate, lineatus, interstitiis medio longitudinaliter obsolete *foveolatis*. Endocarpio spongioso crasso 4-locularis, 4-spermus. Semina unica in quoque loculo longitudinaliter affixa, arillo maximo carnoso, semen ? fere omnino includent. crasso albo.

Semen ? tegumento membranaceo tenui continent. mass. subrotundam carnosam albid. radicula cotyledonibus plumula conspicuis,

Hæc massa secus lineam medio lineato est sed obscure, sed cotyledones mutuo adherent et centrum versus conum an radicula an plumula continent et cumeo adhærent.

Aglaia.

1. *Aglaia sexipetala*, Gr.

Ramuli brunnescentes, teretes flexuosuli. Folia trifoliata. Petiolus teres utrinque incrassatus sub-biuncialis, foliola sub-elliptica breviter et obtuse cuspidata subcarnosa $3\frac{3}{4}$ unc. longit. latit. biuncial : ven. secondariis conspicuis et arcuatim nexis, reticulatis etiam subtus obscure: petiolule fere 4-lineales supra sulcatam.

Panicula ex axillam folii evoluta ultima vix ultra digitum longit. cum partibus nov. minute ferruginea, pilis sublente stellatis, ramis patentissimis brevibus, ultimis racemiforme vel subcymos.

Flores minuti numerosissimi clausi lutei.

Cal. eodem more pubescens 5-sepalus, minimus.

Petala 6, oblonga, concava connivente in corollam apicem depressa parvia, biseriata, seria intima duplo fere minora.

Urceolus stamin. inclusum, apice 10-dentat. dentibus 5 alternis antherifer, 5 aliis obtusis, obsoletis. Antheræ ovato-cordatæ sessiles bilocul. deorsum spectantes, introrsæ. Pollen albidum.

Ovarium stigma magno disciforme capitat. obsolete trilobum coronat. fundum urceoli nuncupans, pilosum vel lepidotum, cylindraceum, minimum.

Ovulum anatropum, pendulum, vel subappensum, sæpe ut videtur nullum, foramen superum.

The observation of the ovulum is difficult, owing to the minuteness of the parts, but certainly it appears single and solitary.

Hab. Malacca at Ching: *Jan. 27th*, 1845.

2. *Aglaia Dookkoo*, Gr.

Arbor mediocris, fol. pinnatis petiolis, petiolulis basi incrassatis, fol. alterna oblongis, interdum oblongo-obovat. lateri

inferiorum inæqualiter, subundulat. coriaceis glabis venis 2-dariis obliquum arcuatis, intervenia reticulatis.

Racemis abbreviatis 2-3 uncialibus fasciculatis ex axillis, vetustis, fol. orbatis robustis.

Bractea min. sub floremqueve. Fl. breviter pedicel. pedicello robusto, alabastris cum pedicellis depresso-turbinat.

Calyx minutus 5-sepalus, sepalis basin carnosis ciliatulis.

Cor. connivent. urceolata, petalis 5, rotundatis concavis, apice depresso hiante, stamina apicis et stigma exponent imbricata, 2 exteriorum, 2 intermedium, ½ intern. (one border overlapped) carnosiuscula.

Columna stamina brevissime depressa et quasi incurvata carnosa, simplex. Anth. 10 intra os inserti, infra antheras tubus angustatur.

Ovar. oblongo-conica. Stylus 0. Stigma a large truncate subpentagonal body, infra medium 5-loculare, loculis 1-ovulat. ovulis pendulis anatropus.

Hab. Malacca at Malim.

This is distinct from the Lanseh of the Malays, than which it is considered much finer, in the shorter spikes, and the broad depressed flowers.

It appears to me closely allied to Aglaia.

The spikes of the Lanseh are proliferous at the apex. The inner locelli of the anthers are the largest, the outer are, I think, the largest in the Dookkoo.

3. *Aglaiæ* sp.? Pl. DLXXXIX. Fig. 1. *Burseracea.* Itinerary Notes, p. 176, *no.* 898.

1. Alabastra.
2. Flower imbrication various.
3. Flower.
4. Do. seen vertically, anthers deciduous.
5. Longit section, } Shewing the insertion of the petals
6. Do. .. ... } and stamens into the cup.

7. Petals stamens and glandular cup removed viewed exteriorly, the cellular portions are those to which the calyx adhered.
8. Stamen inner view.
8*a*. Do. outer, 8*b* do. after dehiscence.
9. Pollen.
9*a*. do. immersed.
10. Pistilla, ovary opened longitudinally.
10*a*. Ovulum, 10*b* do. longit section.
HAB. Bootan.

ANDERSONIA.

Andersonia Rohitoca, Pl. DLXXXIX. Fig. III.

Arbuscula. Fol. impari-pinnatis, foliolis subbi-jugis oblongis obtuse acuminatis obliquis, terminali minora, floribus racemoso-paniculatis (paniculis nutantibus) minutis, suaviter odoratis.

Cal. minutus, 3-fidus segmentis rotundatis subæqualibus, marginibus membranaceis.

Corolla connivens? 3- petala, petala rotundata concava, 3tium anticum æstivatione imbricata.

Tubus staminifer urceolatus, carnosus petaloideus, apice angustata minute denticulata, stam. 6 basi tubo inserta inclusa, 3 sepalis, 3 petalis opposita. Filam sub 0. Antheræ orato-lanceolatæ erectæ introrsæ, longitud. lateraliterque dehiscentes, connectivo majusculo.

Stylus 0. Stigma magnum capitat. 3-gonum, angulis sepalis oppositis, ovarium superum 3-loculare ovula 6, cuique loculo, superimposita, placentis affixa, supremo ascendente, infimo pendulo foramen conspicuum hilum prope.

Fructus. ?

Prope Jumalpore: *Sept*. 21*st*, 1835.

a. Calycis dentes.
b. Petala.

c. Staminum urceolus.
d. Stamina.
e. Stigmatum triangulus.

Meliaceæ sp.

Arbor demissius ramosa 35 pedalis, ramulis articulatis, articulis tumidis subteretibus viridescent, fol. altera oppositis, pinnatis 2-jugis cum impari. Petiolis basi incrassatis supra subcanaliculat. foliolis ovato-oblongis acuminatis basi inæqualibus serratis, serraturis mucronatis glabris coriaceis junioribus carnosis nitidis, stipulis caducis, (nondum visis) cicatricula lato linearia, inter petiolari stipellis? subulatis, ad basin petioluli cujusque, 2 ad basin paginæ cujusque.

Inflorescente axillaris sæpius terminal. cymoso-corymbosa, floribus parvis numerosis inconspicuis fuscescente suave odoratis corymbum ramuli articulati basibusque bracteati.

Cal. 5 sepal. sepalis valde inæqualib. 2 exter minorib. ovatis oblongisve pallide rubro-fuscis, æstivation 5-uncial? interdum 6, vel basin 1-bracteat.

Pet. totid. iis alterna, hypogyna.

Stam. 5 hypogyna libera sepalis opposita, filam subulato complanata basib. valde dilatata. Anth. versat. bilocul. longit. dehiscent. Pollen ovatum læve hinc sulcat.

Discus hypogynus annulat. intra stamina ovarique, crenulatus sublobatusque albus.

Stylus 1, e 3 subcoalitis, stamina subæquans. Stigma capitat. subdiscoid, e 3-coalit.

Ovaria 3 leviter coalita 1-locular pauci ovulat. ovulis placentis axilibus affixa pendula biseriat. foramen hilum prope conspicuum.

Hab. Mergue. In sylvis. Pullow: *Jan.* 1835.

Pollen aqua immersum Onagraoideum. Ex charactere Zygophylleis accedit, staminib. petalorum numero æqualibus exceptis.

Habitus omnino Meliacearum, Zygophylleis affinis.

LYTHRACEÆ.

Lawsonia.

Lawsonia inermis. DXC. Fig. II.

1. Bud.
2. Flower.
3. Ditto magnified
4. Front view of anther.
5. Back ditto ditto.
6. Longit. section of ovarium.
7. Ovule.

— *a* motion rapidly vibratory, *b* motion rotatory capable of assuming the globular form. 1831.

Lagerstrœmia.

1. *Lagerstrœmia floribunda,*

Frutex: foliis suboppositis ovato-oblongis, glabris, floribus paniculatis, numerosa sæpius 3 in cuique ramulo, paniculis terminalibus ferrugineo-villosis ramosiss.

Cal. extus ferrugineo-villosus profunde, 18-sulcatus, sulcis sepalis oppositis nempe ab ejus nervo medio virginatibus majoribus, sulcis sinubus oppositis ad sinum prominentibus, 6-dentatus, dentibus reflexis apicibus in processum subulatum euntibus.

Pet. 6, breviter unguiculata, limbo ovato plicato repando, sepalis alternantia.

Stam. 00, inæqualia, pluriserialia, seriea externa e 6 sepalis opposita, longiore, discoloriaque, Filam. subulata 6 exterior declinatis, rubris, reliquis subascendentia, albidis. Anth. bilocul. long. dehiscentes, connectivo lato, 6 exterior fusco-rubescent reliquorum luteum.

Stylus declinatus stigma obtusum.

Ovarium dense villosum spuria 12-loculare, loculis 6, tan-

tum completis, dissepim. 6, aliis parietalibus. Ovula 00 angulosa.

Hab. In sepibus mergue : *August*, 1834.

Obs. It does not belong to the section given in DeCandolle, but properly to a distinct section.

Cal longit. plicatus sulcatusque. Stam 6 exteriora majora.

Char. spec. Foliis suboppositis, oblongo-ovatis glabris. Paniculis ramosis, terminalibus ferrugineo-vilosis. Stam. 6 exterior eoque declinatis. Pet. primo pulchre rosacei, demum alba !

2. *Lagerstræmia parviflora*, Pl. DXCII.

Arbuscula, ramulis subteretibus brunneis cortice cracked, ramulis 4-gonis viridibus, angulis quoque ad margin petioli brevis desinent, fol. subopposita basi minute stipulata, stipulis dentiformibus brunneis cordato-oblongis vel lanceolato-oblongis (superior.) infimis orbicular. subtus glauco-albidis minute reticulatis.

Paniculis axillaribus foliis brevior vel subæquant. dichotomis. Pedicelli basi articulatis his florum 2 infimorum lateralium bibracteolatis floribus suave odoratis.

Stam. 00, breviora antheris luteis 5 longiore majoraque sepalis opposit, apice purpurascent. Anth. brunneis. Stylus albus bigeniculatus, stigma purpurascens.

Hab. Burmah. Bamon Sylvis : *April 28th*, 1837.

Pemphis.

Pemphis acidula.

Arbuscula ramulis junioribus tantum foliosis, foliis oppositis subsessile lanceolatus subobtusis, integris, coriaceis, pilis adpressis subsericeis albidis, 1-nerviis, floribus axillaribus solitariis pedicellatis albis, pedicellis basi bibracteatis, foliis brevioribus.

Cal. subcampanulatus, tubo 12-striata, limbo 5-dentato sinubus 5 in dentibus productis ideoque 12-dentatus videtur.

Pet. tot quot dentes sinubus inserti subsessilia, lanceolato-sinuata repanda.

Stam. inclusa medio tubo inserti, 12 ; 6 longiora sepalis, 6 breviora petalis, vel sinuum dentibus opposit. Anth. bilocul. longit. lateral. dehiscent. Stylus filiformis stam. superans. Stigma capitat.

Ovarium liberum breviter stipitat. 1-locul. ovulis ascendent. placenta centrali affixis.

Capsula calyce fere tecta. Stylo stigmatisque persistent. terminata ad apicem circumscissa.

Hab. Mergue. In Ins. parv. flum. Palar : *Oct.* 1834.
Legi etiam in Ins. little cocos, et apud Amherst.

Leptospartion.

Leptospartion grandiflora, Gr. Pl. DXCI. Lagerstrœmia grandiflora Roxb. Itinerary Notes, p. 114, *no.* 193.

Hab. Bootan.

Lythrarieæ, Pl. DXC. Fig. I. Itinerary Notes p. 296, *no.* 934.

1. Plant nat. size.
1*a*. Alabastrum.
2. Flower leaf and bracteolæ.
3. Flower laid open.
4. Stamina lateral and front (iterum examinand.)
5. Anther posteriorly.
6. Pistillum long section.
6*a*. Ovulum.
7. Fruits.
7*a*. Ditto long section.
8. Seed.

8*a*. Long section.
8*b*. Embryo.
Hab. Affghanisthan. *Aug*. 11*th*, 1839.

TILIACEÆ.

Corchorus.

Corchorus olitorius.

Herbacea decumbens pilosa, caulibus teretibus rubescentibus, foliis petiolatis cordato-ovatis serratis acutis, 5-nervis serraturis 1 vel 2 basilarib. aristatis, stipulis setaceis, floribus, inconspicuis luteis racemosis, racemis extra axillarib. 2-3 floris abbreviatis, bracteis setaceis binis cuique flori.

Cal. 4-sepal. sepalis mucronatis, 3-1 nerviis, nervo 1 prominulis, 1 sinistrum quoad axis, nervis 2 prominulis lateralib. ideoque e sepalis 2 coalitis formatus.

Pet. 5, unguiculata hypogyna, sepalis alternantia.

Stam. 00, hypogyna basi in cupulam brevem coalita, filam. filiformia. Anth. biloculares longit. Stylus filiformis, filamentis duplo brevior, stigma capitat. 3 dehiscentes. Pollen.

Ovatum leve ovarium 3-gonum pilosum, loculare ovulis 00, placentis axilibus affixa subpendula foramen hilum prope.

Hab. In ruderatis Madamaca Mergue: *Sept*. 1834.

Triumphetta.

Triumphetta octandra, Gr.

Herbacea ramosa pubescentia stellarum mollis, foliis lanceolato-ovatis basi subcordatis, 5-nerviisque acuminatis duplicato-serratis stipulis linearibus inflorescentia axillaris cymosa, cymis abbreviatis petiolis breviore floribus lutescentibus bracteolis setaceis.

Cal. 5-sepalus, sepalis linearibus patulis dorso pubescentibus apicibus mucronatis intus luteis apicis versus rubro-aurantiaceis.

Pet. 5 nuda, sepalis minora erecta linearia repanda unguibus pilosis.

Stam. 8 hypogyna ima basi 1-delpha, filam. filiformia dentata (more pappi compositam.) Anth. terminat. bilocular. longit. dehiscent. Stylus filiformis stam. paulo brevior. Stigmata 5 simplicia. Ovarium pilosum. Pollen ovulum leve hinc sulcatum 5-loculare, loculis 1-2 ovulatis foramen ad hilum.

Hab. In graminosis, Mergue: *Sept.* 1834.

Spec. unicum adhuc tantum vidi.

Neesia.

Neesiæ sp.

Fructus subrotundum, diametro sub 4-uncialis muricatus. (The murices or prickles are from angular areolations and are themselves angular) pedicellum crassum brevem terminans purpureo-brunneus, loculicidem, valvis crassis lignosis aureo colore.

Semina pauca angulo interiore basin loculi versus vel infra medium affixa ascendentia, oblonga, pressione irregulariter facialia, uncialia long. excluso arill. funic.

Funiculus brevis in arilla carnosum lutescens crassum basin imam seminis more annuli cingentea ampliatus.

Tegumentum castaneum crassum coriaceo-induratum-subcartilagineum, raphe linearis lata $\frac{1}{2}$ completa ad apicem seminis (chalazam) in ramulos palmatim divisus ramulis and hilum fere currentibus.

Albumen carnosum, lacteum copiosum.

Embryo. Cotyled. magnæ accumbentes, albæ foliaceæ oblongæ; radicula infera brevis: as broad as the seed, nempe 4-lineales 7 lines long.

Hab. Ching Malacca Ninghull: *Jan.* 1845.

Brownlowia

Calyx inferus, tubo cylindrico, basi complanatus, 3-dentatus, dentibus 2 duplo majoribus e dentibus duabus connatis evidenter exorientibus.

Petala 5, hypogyna oblonga.

Stamina libera? hypogyna indefinita, 5 sterilia latiora inter fertilia et ovarium. Antheræ oblongæ biloculares, parce pilosa (pilis cellulosis). Pollen globosum.

Endothec. cellulæ sed obscure discernuntur quia antheræ pagina interior mucilaginosa est.

Torus ultra verticillos sepalorum petalorumque elongatus, apice ovarium e carpellis 5 concretis formatum gerens.

Stylus 1, Stigma 1. Carpella, triovulata, ovula horizontalia. Æstivatio calycis valvata, petalorum imbricata.

Obs. In hac planta, glandulæ hypogynæ hujus ordinis in filamenta sterilia mutata sunt, sic natura horum glandularum evidenter monstratur.

Diffect ab aliis generebus calyce 3-dentato, exceptâ Chritianâ, (ad quam accedis etiam carpellis pauce ovulatis, et facile separabilibus) et stigata unico.

Hæc planta primum in Anglia floruit apud Sir Abraham Hume, *Sept. 9th*, 1831, quod celeberrimum Lindley missa fuit.

Vatica.

Vatica trigyna.

Arbor 35 pedalis, trunco altius ramoso, cortice rugosa, ramulis subteretibus, lepidotis, squamis minimis peltatis, laceris subpubescentib.

Fol. alterna bistipulata petiolatis, petiolis utrinque incrassatis, oblongis breve obtuseque acuminatis basi cordatis coriaceis, supra glabris lucidisque subtus, ad nervum medium uti ramuli lepidoti-pubescentes, pagina glandulis? lutescent. crebris stipata, nervis secondariis conspicuosiss. et ad fere ad margines current.

Glandulæ vel peltatæ dentatæque lutescentes, vel dicoloratæ integræ, subcapitatæ. Stipulæ caducæ cicatriculi obliquæ lineari.

Racemis paniculatis axillaribus, pendulis floribus majusculis, albis odoris per ingratem. Pedunculi uti ramul pubescenti lepidoti, pedicellis calycibusque extus subvelutinis.

Cal. persist. 5-sepalus, sepalis ovatis patentib. inæqualibus, 2 exteriorib. paulo longiorib. obtusis, 3 inter acutis.

Pet. 5 hypogyna, ovata, subconcava patente sepalis alterna, subacuta decidua, æstivat. convolutum imbricata.

Stam. 00 hypogyna biserialia libera toro clavato inserti, filam. brevissima. Anth. basibus affixæ membranaceæ, biloculares, locellorum paginæ exteriores longiores, longitud. sed præsertim apices versus dehiscent. connectivum in setam longissima anthera 4-plo excedent. product. post petalor. lapsum persist.

Stylus crassissimus subconicus stigmata 3 simplicia subpatentia.

Ovar. superum liberum, 3-loculare, loculis 2-ovulatis, ovulis pendulis, foram. superum, tegument. ovuli 3 distinctiss.

Hab. Mergue. Ad summitatam Collis Pator altitudinis 600, 800 ped. Stylus omnino ovario conformis, stylus est nec ovarii prolongat. ob canali centralem inter stigmat. bases et loculos ovaria current. Torus pubescens. Tela stamina scabra. An genus proprium ob stigmata 3-stylumque.

DIPTERACEÆ.

Dipterocarpus.

Dipterocarpus grandiflorus.

Arbor excelsa formosa trunco 60 pedalia, apicem versus ramosa, ligno duro, fluido resinosæ fæto. Ramulis compressis petiolisque pubescentia brevi stellaria. Stipulis densissime pubescent. apicibus pilis ferrugineis hispidis, cicatriculis oblique.

Petiolis 3-uncialib. apices versus incrassatis, fol. ovato-

acuminatis basi subdeltoideis, coriaceis repandis glabra venis secondariis distinctiss. ad margines fere current.

Inflorescentia spicato-racemosa, axillaris.

Fructibus sæpius solitariis (abortu) pendulis in pedunculis elongatis cicatricibus florum lapsorum notatis, maximis 5-alatis, 6 uncialibus, alis carnosis.

Calyx fructus 5-partit. lobis 8, rotundatis *abbreviatis* 2, in aliis longissimis, foliaceis venosis rubris 5 unciales productis obtusis capsula apicem versus argenteo-sericeis 1 locular. 1 sperma.

Pedicellis incrassatis, capsulis immaturis bases versus tantum cavis apicibus crassissimis, carnosis, lata pyriformibus.

Hab. Mergue. In sylvis, elatioribus. Pator, arbor inter alissimos altus, oleum lignum præbet. *Feb.* 1835.

Sunaptea.

Sunaptea odorata, Gr. Pl. DLXXXV, A. Fig. V.

Arbuscula frutexve, ramulis subcompressis petiolisque velutino-pubescent.

Fol. altern. ovatis obtuse acuminatis integris glabris reticulatis, bistipulatis, stipulis, membranaceis, ovatis caducis.

Inflorescentia racemosa axillarisque vel paniculata terminatis. Pedunculis pedicellis calycibusque extus albido-velutinis. Bracteis caducis membranaceis floribus majusculis, albis odoratissimis, in pedicellorum apices brevissimas subnullasque articulat. sæpe secundis.

Cal. ultra medium 5-partit. laciniis linearibus obtusis, velutinis reflexis inæqualibus, per æstivationem valvatis.

Pet. 5, lineari-spathulata uncialia medium infra 1-torta hypogyna caduce ob torsione genitalia obtigentia.

Stam. 15-17, perigyna basibus dilatatis toro submonadelph biserialia. Filam. basi dilatata brevissim. Anth. membranaceo bilocul. longit. lateraliterque dehiscent. Connectivo in apiculum brevissime producto.

Stylus brevis filiformis apice dilatat. Stigmata 3, oblonga media sulcata in styli discum composita.

Ovar. pubescens 3-loculare seminferum, loculis 2-ovulat. ovulis pendulis foramen supera, tegumenta ovuli distinctiss.

Hab. In sylvis humidiusculis. Mergue : *Jan.* 1835.

Anth. loculorum paginæ inæqualis, post dehiscent. pagin. dorso per paria arcte approximatis, 2 major. 2 minoribusque.

Pollen oblonga læve his sulcatum.

Omnia Dipterocarpeo petalis, staminabusque perigynis et æstivatione calycis valvata exceptis. Pet. æstivat. contorta odor flor suavissimus aromaticus.

From *Sunapto* Gk. Jungo ; ob ovarium calyci adnatum.

Habitus Vateria lanceæfoliæ, Roxb.

Fl. Indica vol 2, p. 601. Ejusdem Icones in suppl. 4, t. 68.

ELÆOCARPEÆ.

Elæocarpus.

Elæocarpæ sp.

Ramuli. teretes. Fol. longiuscule petioluta (petiolis utrinque incrassatis teretibus,) ovato-lanceolatis obtuse acuminatis grosse distanterque serratis glabris subcoriaceis, marginibus cartilagineis. ramulinis tantum.

Racemis raminis exaxillis folior. lapsor. erectis 3-4 uncialibus multifloris.

Bracteis lanceolatis caducis, floribus nutantib. elegantissimis albis.

Sepal. 5 lanceolata lineari decidua æstivatione valvata.

Pet. totidem iis alternantia, apicibus profunde capillacea incisis, parte integra hypogyna.

Stam. biserialia circiter 30, toro elevato velutino, glandulos inserti, libera serie externa fasciculata, fasciculis subpertardiis. Serie interna subdecandra, staminibus nempe 2 utrinque fasciculi cujusque. Filam. series externæ brevia, internæ 3-plo longiora, breve pubescent. Anth. lineari quadratæ, brunneo-velutinæ, apicibus bilabiat. dehiscent. bilocul.

Stylus subulatus, e 3 coalitis. Stigma simplex subacute.

Torus staminifer repandus vel crenato-lobatus.

Ovar. breve pubescens, 3-loculare loculis 2-ovulatis, ovulis pendulis, foram. superum hilum prope.

Fasciculis stamin. seriei exterior 3-5-andris, petalis oppositis in sinubus loborum tori inserta interiora, per paria sepalis oppositio! brunnescente, exterior albid. lab. exterius post dehiscent. apice setulas geresis.

Alternation and situation of the parts of the flower, Pl. DXCII. Fig. II. *a* inner, *b* outer series.

Hab. Mergue. *March*, 1835.

Æstivat. pet. convoluti-valvata.

Monocera.

***Monocero tricanthera*, Gr.**

Arbuscula, ramulis subteretibus.

Fol. alternis stipulatis, (stipulis caducis cicatricula angusta, punctæformis) ovatis obtuse acuminatis serrato-crenatis, marginibus cartilagineis penninervis reticulatis glabris.

Racemis terminalibus et axi'lis foliorum summorum sericeo-pubescent. foliis longior.

Pedicellis basi 3-bracteatis? bractea anticum lanceolato-lineare laterali minimis setaceis, brunneis floribus inconspicuis, viridescent nutant.

Cal. 5 sepal. sepalis lanceolatis acutis extus sericeis, æstivatione valvatis. Ad anthesin inferne longitudinaliter fissure ad medium, carnosa.

Cor. pet. 5, sericea præsertim intus, sepalis conformia et medio clavato marginibus arcte incurvis, et concoloria, apicibus inciso-dentatis a medium supra erecta. Æstivatione involuto-valvatis (marginibus involutis) discus glandulosus 10-lobus, lobis pilosis sericeis, staminaque per-paria sepalis opposita.

Stam. 00 hypogyna libera filam. brevissima sericeo-pilosa.

Anth. subulatæ longissimæ pilis longis subsericeis hispidissim. loculis inæqualiter connectivo in apiculo subulato apice tantum pilifero longe producto per anthesin extrorsum flexo, anth. bilocular apicibus hiantibus ob paginarum separatione, minutissim. hinc sulcat. Pollen (aqua immersa, ovat.) globosum læve.

Stylus subulatus glaber. Stigma simplex, acutum ovar. superum ovatum parce longeque pilosum, biloculare, loculis 00 ovulatis, ovula foramen conspicuum ad apicèm ovuli, piloque subpropinquum ad apicem locul. spectans. tegumentum ovuli distinct. Pl. DCXIX. Fig. III.

HAB. In aquosis inter fruticetes. Mergue : *Dec. Jan.* 1834.

Anth. iterum examinandæ subula an e loculo exterior ? omnino orta vel e connectivo Monocera tricantheram.

MALVACEÆ.

HIBISCUS.

1. *Hibiscus vestitus.*

Arbuscula 20 pedalis formosa umbrosa. Ramulis petiolis pedunculisque pilis longissimis subpungent. fasciculat. hispidiss. fol. reniformi-orbicularia abrupte longeque acuminat. basi 7-nerv. subintegra scaberrime, stipulis maximis membranaceis, hispidiss. deciduis.

Racemis terminalibus axillaribusque paucifloris, alabastra, bracteis binis oblongis membranaceis spathaceis obtect. floribus maximis nutant. luteis fundo atro-sanguineo.

Invol. e foliolis 10 linearib. acuminat. intus subcarinat.

Cal. profunde 5-partit. basi fere usque, sepalis acutis 3-nerviis.

Cor. convoluto-infundibulif.

Tubus stamin. a basi fere antherifer.

Stigmata 5 clavato capitat. atro-purpurea. Ovar. 5-loculare loculis polyovulat. ovulis biseriatis.

HAB. Mergue. In sylvis Ins. Madamaca et Kullygyoon florifera rara. *Feb.* 1835.

2. *Hibiscus heterophyllus*, Gr.

Herbacea aculeis recurvis hispida, folia longe petiolatis caulinis palmatim 5-lobis, lobis lanceolatis nervis aculeatis ramulinis, cordatis vel caulinis similib. vel cordatis obsoleti 5, vel 3-lobis, multo minus aculeis asperis, stipulis magnis longe ciliatis dimidiato-cordatis.

Involucri appendiculis lanceolatis e glandulosis 3-nervis, parte continua lineari-subulata breviorib. calycibus hispidissimis.

Hab. Mergue. In ruderatis Plateour : *Nov.* 1834.

3. *Hibiscus sanguineus*, Gr.

Caulibus ramosis sanguineis ? Parce pubescens.

Fol. longe petiolat. petiolis adultioribus sanguineis, junioribus viridib. sanguineo colore maculatis tinctisque, fol. basi subcordato, senior palmatim 4-5 loba, junior. 3-loba per juniorem simplice, lobis lineari-lanceolatis serratis subglabris, venis primariis purpurascent. nervo medio basin versus glanduloso.

Stipulis foliaceis linearib. floribus axillarib. solitariis carneo-ochroleuca, pet intra medium sanguineis pedicellis brevibus, brunneo-sanguineis.

Invol. 10-phyllum foliolis lanceolatis carnosis rigidis sanguineis.

Cal. campanulat. 5-partit. extus hispidus laciniis ovato-lanceolat. 3-nerviis, nervis sanguineis, spatiis interjectis viridib.

Stam per totum tubum sparse pallide sanguineum.

Stylus apice palmatim ? 5-fidus, stigmato 5-capitat. ovarium 5-locule, loculis pluriovulat.

Hab. Mergue. In aquosis. Ins. Kully Gewen : *Oct.* 1834.

Sepalor. nervus medius paulo infra medium glandulam ovatam longitud. sulcatam gerens, fol. adulta aliquando simplicia. H. cannabinis affinis sed caulis non aculeat. involucra foliol. subglabra, et sepalis 3-nervia nec 1-nervia.

4. *Hibiscus abelmoschus.*

Hispidissima pilis pungentib. erecta foliis in petiolis longis supra canaliculatis, palmatim 5-lobis, lobis oblongo-linearibus obtuse serratis, stipulis lineari-subulatis, floribus in racemis terminalibus paucifloris, maximis conspicuis, nutantis, flavis, fundo atro purpureo.

Bracteæ vel folia mutati sessiliæ multifidæ. Involucrum 8-phyllum, fol. linearib. inæqual.

Calyx spathaceus hinc fissus.

Stam. numeros. per totam longit. tubi, stigmato 7-8 velutina an plura aterrima purpurea.

Cor. campanulat. Ovar. extus piloso sericeum, 5-loculare, loculis pluriovulatis, ovulis biseriatis.

Hab. In humidis. Ins. Kully Gewen: *Oct.* 1834. Omnia Hibisci, sed cal. hinc fissus.

5. *Hibiscus hispidissimis*, Gr.

Caulibus erectis pilis pungentibus asperis, pilis albis, basibus tumidis rubris.

Fol. basi cordatis 5-lobis, lobis oblongis, dentatis stipulis linearibus, floribus axillaribus pedicellis apicem versus articulat.

Involucrum 10-phyllum, lamina interiora limbum superante inter se subconniventes.

Cal. 5-partit. laciniis 3-nerviis, corollam expansam non vidi.

Ovarium 5-loculare, loculis pluri ovulat.

Hab. Mergue. Ad littoram Ins. Kully Gewen, inter gramina: *Oct.* 1834.

Tota planta limbo foliorum involucraque excepto pilis supra descriptis, aspera pungensque.

Folia diversiformia, interdum Grossulariæ referentia.

6. *Hibisci* sp. *Sect. Furcaria*

Herbacea erecta, 5-6 pedalis, caulibus teretibus (alternatim linea pilosa,) parce aculeatis, foliis longe petiolatis

petiolis aculeatis pubescent. palmatim 5-partitis, junioribus 3-partis, lanceolatis, grosse serratis, acutis, marginibus rubris lobis lateralibus subbilobis, floribus axillaribus solitariis maximis formosus citrinis, tubo sanguineo, subodoratis. Stipulis linearibus. Involucr. polyphyllum, foliolis, linearibus, acutis, intus ad apicem processum subulatum gerentibus.

Cal. 5-partitis laciniis acuminatis, 10-nerviis.

Cor. campanulata, petalis ad basin fere discretis obovatis crenato-sinuatis, nervosis.

Tubus stamineus 1½ uncialis carnosus, ruber, glandulo-so-pubescens, filam. libera facto breve subulata sæpius verticillata et 2 ex eadem puncto. Anth. reniformes biloculär. Pollen hispidum globosum. Stylus filiformis longitud. tubi stamin. Stigmata 5-capitata velvety atro-purpurea.

Ovarium 5-locular, piloso-sericeum loculis polysperma.

Caule herbaceo petiolisque aculeis curvatis, scabris, stipulis linearibus, foliis palmatis 5-lobis, junior 3-lobis, bilocellis brevibus involucell.

Culta circa Mergue: *Sep.* 1834.

Urena.

Urena lobata.

Herba ramosa erecta, scabriuscula, ramulis teretibus. Folia longe petiolata, late cordata, 3-5 lobata, grosse dentata, dentium sinubus latis, 7-nervia, utrinque villosa subtus l-glandulosa.

Flores rosacei terminalis in ramis lateralibus parvis foliosis.

Cal. et involucr. foliola oblongo-lanceolata.

Stam. deorsum spectantia.

Ovarium pilis cellulosis hispid. demum muricatum. Stylus apice 10 radiatus, radio quoque stigmato capitato papilloso terminato.

Hab. Frequentur in sylvis apricis et ad vias Amherst Moulmein: *Dec.* 1834.

Sida.

Sidæ sp.

Herba erecta. 3-pedalis, caules flexuosi glabri paululum compressi.

Fol. cordata profunde 3-loba, lobis acutis, centrali majore, juniora subintegra. 5-nervia subcrenata scabra petiolata. Pili breves fasciculati. Glandula cava ad basin cujusque fol. in nervum medium sita.

Flores subcorymbosi conspicui lutei, intus ad bases sanguinei. Corymbi terminales, Involuc. sub 0, 1-phyllum, dentibus 5-6, setaceis.

Cal. campanulat. 5-dentat. sinubus latis, dentib. subulatis.

Cor. marcescens. Anth. reniformes 1-locul. Pollen hispidum. Stigma clavat. sulcat. Carpella sæpius 4, glabra, polysperma.

Hab. In sylvis et ad vias Moulmein : *Dec.* 1833.

Paritium.

Paritium tiliaceum.

Frutex vel arbuscula, fol. longiuscule petiolatis cordato-reniformibus brevissime acuminatis coriaceis, subtus pube adpresse albidis, venatione aggregatis, floribus racemosis majusculis citrinis fundo sanguineo.

Racemis paucifloris axillaribus terminalibusque. Bracteis ovatis membranaceis, pallide purpurascente.

Involucro persistente 1-phyll. 10-fidum.

Cal. profunde 5-partit. Stigmata 5 hispida.

Ovar. 5-loculare, loculis pluriovulatis. Cor. convoluto campanulata. Pollen hispidissimum.

Hab. Ad littor. Ins Madam. cum Rhizophoreis, Mergue : *Dec.* 1834.

STERCULIACEÆ.

Heteropyxis.

Heteropyxis, Pl. DXCIV.

Arbor parva: ramulis partibusque novellis, alabastris dense furfuraceosque armatis.

Stipulis caducis linearibus pedicellis excedent.

Fol. alterna brevi-petiolata ovata, vel oblonga, vel obovato-lanceolata obtuse et mediocriter cuspidata integra, subtus ad venas et parce per paginam totam squamis peltatis ciliatis.

Floribus solitariis in axillis foliorum lapsorum deorsum deflexa ideoque (secundi *ramos*.)

Pedicelli petiolis paullo brevior angulata e bracteati.

Alabastra initio involucro omnino tecta. Involuc. valvatum diphyllum: dentus persistentes, per anthesin basi reflexa patens.

Cal. inito tubum oblongum conicum efformans apice 4-valvis, valvis demum per totam longitudine secedent. reflexo-revolutis intus pubescent.

Pet. plura sæpuis ut videtur tria, interdum 4, in sinubus cujusque sepala, lineari-spathulata angustissima, si 3, lateralia minora, vena centrali prædita, et quasi pellucido-glandulosa, æstiv. erecta.

Stam. 00, extima breviora castrata, intima majora completa subnovem seriebus intermed. grad. evolutionis completum œstendentibus. Filam. ima basin subcoalita subulata, 1-venia.

Connectivum peltatum affixum, vasis tot quot pyxidulis evasi centali radiant.

Anth. e pyxidis 1-7, sæpius incompletis intimis 4-5-7, erectis e connectivo peltata, omnino discretis, apice poro centrali dehiscent. dente et minuto pubescent.

Pollen globosum, 3-4, plicatum ? The outer coat on immersion appears to contract between the spaces or lines along

which the inner coat is exposed, and this without any increase of size.

Ovarium sessile oblongum, squamis longe pedicilat. peltatis pulchre fimbriatis omnino tect. 3-loculare, loculis 3-4 ovulatis; ovula si 4, per paria subcollat. si 3, par inferum impar superum ascendentia, anatropa. Stylus longitudine staminum intimorum perfectiorum, sub 3-sulcatus, stigma terminal. obscure 3-sulcatum.

Branch flowering, nat. size.

1. Flower-bud just opening.
2. Flower-bud opened forcibly.
3. Flower, seen posteriorly.
4. In front, the genitalia removed to shew the petals and their common situation.

5*a*. Central petal.

6 6, 6, 6, 6. Various outermost effete stamens.

6*a*, a 1-Pyxidate stamen.

6*b*, a 2-ditto.

6*c*, a 4-ditto. 6*c*, also back view of the same.

6*d*, a 5-ditto.

6*e*, a 6-ditto. bifurcate.

6*f*, an 8-ditto. also composite shews the furrow and disposition of the pyxidæ.

6*g*, a 6 ditto. under pressure shewing its vascular fascicles.

7. Section, long of anther.
7*a*. Cells of endothecum.
8. Pollen in water.
9. Ditto acted on by water.
10. Pistillum.
11. one of the scales.
12. Transverse section of ovary.
13. Longitud. ditto, ditto.
14. Ovule.
15. Ovula of one placentæ in situ.

16. Long section of ovule, anatropous with two tegments and a ½ complete raphe.

The fruit, like the flowers, seems to be rare at this season (October) at least; it is ob-obovate clavate, surrounded at the base by the withered calyx corolla and stamens, and is densely armed with conico-subulate, acute thorns.

I have only seen small ones, the largest judging from fragments would seen to be at least as large as a hen's egg.

Trilocular, *by abortion of* 1 *cell*, sometimes empty. Cells 1-seeded! Seeds oblong, cylindrical or flattened a little on the inner face, erecto-appense attached by a largish longitudinal hilum to near the base of the cell, at this place the abortive ovule will be found. *Arillus* vascular very incomplete; margin irregular.

Raphe etc indistinct. The *young albumen* is so plentiful as to make me think that some will be found in the seed.

Cotyledons foliaceous, (radicle inferior) broad diameter parallel to the axis of the fruit.

HAB. Malacca. In sylvis densis viæ Ayer Punnus et Rhim; also here and there in the forests about Ching.

CHAR. Flores ochroleuco-albidi, aspectu elegantes, specimen desiccata cano albida, vivent. foliis supra atro-viridibus.

Antheræ si plura pyxidibus quam sex, e duobus staminum coalitis conflat. testatur filament interdum apice bifurcum: the increased size of the filament, and its venation.

OBS. It may appear paradoxical to associate with Bombaceæ, a plant which has a plurality of petals, not even being always multiples of the calyx, discrete stamina, and stamens either sterile, or with from 1 to 8-pyxidal anther-cells, each opening by a pore at the apex.

But great as the dissimilarities appear to be, they cease to exist upon examination.

In the last edition (2*nd*) of Lindley's Introd. to Nat. Orders Bombaceæ are included in Sterculiaceæ, one of which distinctions is 2-celled anthers, and in the enumeration of the more prominent marks of the tube.

Bombacæ are said to have a calyx with a ruptile dehiscence.

The first statement is an obvious error, the second will exclude Durio from the family.

There is however an objection presented by the venation of the filament which may be of some weight. I allude to its having only a single vascular fascicle when presenting no traces of composition, such as furrow, or division. This having two fascicles, when it does present such, I consider it to intimate that the union has been secondary, each fascicle representing that of one phalanx.

The fact of the coalition of the stamens taking place at all, leads me to doubt whether, whenever there is more than one pyxide, the anther is not composite. For the radiation of the vessel towards the pyxid is contrary to the usual venation of anthers, and it would be consonant with the structure of the family both as regards unilocularity of the anther, and composition of certain of these.

There is nothing it appears to me in the petals, when more than one in number, beyond the deminished size of the lateral ones, to indicate, that the plurality arises from excessive and complete division of one lamina, but even this structure may be considered reducible to that of the family, the petals of which have many basilar veins, or several primary vascular fascicles.

The composition of the interior stamina is further pointed out by the corresponding increase in size, as we proceed towards the centre.

From some appearances of part of the pollen when the case is freed entirely from its contents, it is not improbable that its development is gradual, as has been observed by Mr. Brown in certain Aroideæ, with not I believe, a very dissimilar dehiscence of the anthers.

It is to be remembered too, that the radiation of the vessels in the connective is scarcely discernible in old specimens, at least so I find it in macerated specimens.

That the petals are subjected to a process, the opposite of that which affects the stamens is probable, from the lateral ones being occasionally lobed, and from each series presenting that gradual diminution of the size of the veins from the centre towards each side, that characterises the petals of Malvaceæ and Cucurbitaceæ. The lateral ones also occasionally present oblique venation or such as 2 veins which is to a considerable degree incompatible with independent simple organs, and certainly would be in this case anomalous; for all the petals being single and independent, should have similarly organised vascular supplies, this also becomes probable from their situation, for independent petals could not be so disposed without a greater anomaly than the complete division of ordinarily entire bodies.

It appears to me not improbable, that this plant will lend some confirmation to the separation of Bombacinæ from Malvaceæ: the composition or enlargement of the stamens towards the centre being remarkable, and the reverse of what might *a priori* be expected.

It will also turn out, perhaps, that the genera with fractuose anthers have highly compound ones, and such a form is very likely to arise from the cohesion of a number of pyxidate anthers.

Malacca, 1842.

DURIO.

1. *Durio zibethinus*, Pl. DXCVI.

Involucro diphyllo æstiv. valvato, foliol. concavis, coriaceis e basi subdeflexa: ascendentia erecta.

Cal. basi insigniter depressus intus in annulam ampliat: tubo magno, breviusculo rotundato 6-gono: his sepalis dorsorum ($\frac{1}{3}$ down,) 5-partit. laciniis errectis, apicibus patentibus, *æstivat. valvata*.

Cor. magna e petalis 5, late obovatis, convolute, when freed from the calyx, spreading, but still concave. Pet. un-

guiculate, ungue crasso extrorsum, concavo. Phalangis tot quot pet. his opposita, eodem modo extrorsum concava, 8-10 filamentosa, filam lateral minoribus et breviorib. versus centrum gradatim ampliatis.

Anth. externæ 3-lobæ, lobis subreniform basi lata confluentibus et filamento peltatem affixa, loculis very shallow occupying convex edge of the lobes.

Connectivum papillosum, if of 3 stamina, there is only 1 vasc. fasc. to the filament which is radiately lobed above, connective if of more, the central ones which consist of as many as 9, have 3 vasc. fasc. to the filament and 3 empty alternate spaces, but these lacunæ have no such arrangement in the unguis of the phalanx.

There, the outer ones are generally opposite the outer vasc. fasc., the others being few, or none in definite order.

Gradation of vessels of phalanx 1-2-3-$2\frac{1}{2}$-2-1.

Each sepal has at its base, and its inflexed portion, a large yellow secreting surface, occupying the whole of that part of the surface.

There is great conformity between a transverse section of the claw of the patal and the base of the phalanx, and in the former the central vein is obsolete, whence an argument in favour of the composition of the Petals.

Stam. 5-adelpha, in torum conoidem inserta, phalanx petal opposita 9.

Pollen globosum paris 3-5? or plica 1?

Ovar. sessile in apicem tori; conoidem oblong. 5-loculare, extus squamis peltatis breve pedicillatis, his pedicellis in fruct. amplexicantur et murices fiunt, peltis deciduis, loculis 5, ovula plura 5-7 sub biseriatim ascendentia, anatropa, foram. hilum prope in latus extern. ovul. Stylus crassus subcylind. pubescens, longit. phalangium. Stigma capitat. luteum obsoletus 5-sulcat.

Lacunæ mucilag. in stylum et ovarium.

Involuc. with no external marks of composite alabast. Calyx elliptica apice valvata 5-sulcata, anthophore now very short.

Petals convolute unguis distant.

Its close affinity with Heteropyxis is now manifest, the points of difference are the tubular calyx, the undivided petals all the filaments autheriferous, and 5-phalageal anthers with a marginal cell dehiscing longitudinally, and 5-celled ovary.

The direction of development is precisely the same as indicated by the smallest lateral anthers of each phalanx, and the largest and longest towards the centre, and the concavity of the base of the phalanx shews that the former are external as regards the axis, the latter, internal.

In both, the filaments only have 1 vasc. fasc. up to a certain amount of composition, they then have two or three.

The larger stature of the inner stamens which certainly is opposed to what might be expected, is characteristic also of Malvaceæ, but none of the plants of that family have such a tendency to composition of stamens, and it becomes worthy of enquiry whether the tubus staminifer of Malvaceæ is due to cohesion of the filaments below, or whether it is the basis from which they spring.

Kœnig's description and figure are not altogether correct, though he gives materials for a more correct, generic definition than has found its way into DeCand.'s Prodromus, the differences which affect the degree of solution of the involucel, the base of the calyx, its distance from the insertion of the involucra, the size of the filaments and style, and their degree of stiffness, may originate from the extensive cultivation to which this species has been subjected.

Kœnig has not understood the structure of the anthers, these he describes as mesenteriform.

DeCand.'s definition contains two remarkable errors, one the calyx is naked, the other, petals smaller than the calyx.

A transverse section shews the nectaria to consist of horizontally attached bed of papillæ.

Hab. Singapore. It is the Dorian of the Straits the odor is that of new milk. *Malacca*: 1842.

The same *Durio zibethinus* from Mergue.

Inflorescentia racemosa, racemis e ramis ortis verticaliter pendulis, furfuraceo-squamatis, squamis peltatis incisis, e cellulis radiata dispositis.

Pedicelli 2 unciales basi articulati clavato-cylindrici. Involucrum 1-phyllum integerrime, demum longitudinaliter et irregulariter rumpens, deciduum, squamatum, infra calycem paulo.

Calyx gamosepalus basi dilatatus ampliatus rotundatusque, 5-6 fidus, laciniis ovatis subacutis, erectis æstivatione valvatis coriaceus argenteo-squamatus.

Pet. 5-6 longe unguiculata, limbo patente obovata albido ochroleuco.

Stam. polyadelpha, adelphis primariis 5, medium infra divisis, petalis oppositis partialibus inæqualibus antheras paucas in capitulis subsessilibus gerente. Connectivum maximum carnosum.

Anth. 1-loculares longit. dehiscent. marginibus ciliato-laciniatas Pollen globosum, læve. Stylus longissimus basi incrassatus supra basin demum deciduus, pubescens, pubescentia compositæ, stigma magna aurantiaceum capitat.

Ovarium densissime pulcherrimeque squamatum, squamæ 4-5 lobi. 5-locularis, loculis pluriovulatis, ovulis ascendentibus foramen hilum prope, tegumentum distinctiss. funiculus brevis, carnosa, crassa, foramen loculi fundum versus spectat. Pl. DXCVI. Fig. II.*a* connectivum.

Hab. Circa Mergue cult. ob fructu. Tavoy copiosissima.

Floret : *Jan.* 1835.

Odor. florem subsuavis.

2. *Durio Oxleyanus*, Gr.

Arbor habitu D. zibethini, ast inflorescentia magis e ramulis quam e rami.

Folia oblonga, breviter et obtuse cuspidata, coriacea, seniora subtus pubescentia.

Racemi subcymiformes pauciflori.

Involucr. diphyllum foliolis patente reflexis concavis.

Calyx subsphærica? urceolatus, uti involucra conspicue squamosus, 5-fidus, dentibus erectis.

Petal calycem paullo superant. spathulato-obovata, erecta dorso pubescentia.

Stam. irregulariter sub 4-adelpha, petalorum longitudine vix exserta, pauca. Filamenta ad medium vix coalita.

Antheræ simplices, consisting of a truncated columnar connectiv. round the margin of the apex and base of which is an entire rim of anther cell.

Ovar. rotundum processubus compositis diversis in pedicellis robustis, apice stellatim pilosis 5-loculare. Stylus columnaris villosus longitudine staminum. Stigma descoid subtrigona. Fructus D. zibethina.

Hab. Malacca, *Doorianua Dahown* of the Malays. A very distinct species of Durio, cultivated by the natives. This, which I first saw in a collection presented by Dr. Oxley to Mr. Voigt, I have called D. Oxleyanus, in commemoration of Mr. Oxley who has passed many years in the straits provinces and paid a good deal of attention to their vegetation.

Malacca: Oct. 1842.

A. D. Zibeth. differt foliis, forma urceolata calyces, petalis parvis erectis, staminibus paucis, brevibus antheraram structuram, ovario extus lamellosa, lamellis stellato-piligeris, squamuligeris, stylo brevi.

Heritiera.

Heritiera littoralis, Gr.

Arbor humilis foliis obovatis obtusis, coriaceis, densissime subargenteo-lepidotis, stipulis caducis, paniculis terminalib. extra axillaribusque ferrugineo-velutinis, floribus inconspicuis parvis extus pallide ferrugineis, intus sanguineis.

Per. campanulatum extus ferrugineo-velutinum 4-dentat. dentibus erectis intus pilosis.

Stam. monadelph in tubum? conica basi valde ampliata papillosa coalita, tubo stellati pubescente ultra antheres breve producto. Anth. 8 adnatæ, 1-loculares longit. dehiscentes an 4-2 loculares.

Fæm. Per. ut in mare. Rud. stam. 5 corpore linearia cariosa apicibus emarginata.

Style brevis. Stigmata obtuse. Carpella 4, 1-locular endocarpio pubescente 1-ovulat. ovulo ascendente, 1-2-3 demum sæpe abortientia.

Carpella matura radiantia, foliacea, ventre triangularia dorso convexa margine foliacio brevi repanda nervo medio infra apicem dorsi e liguliformem processum foliaceum expanso.

Testa seminis immatura quam maxima fungosa.

Semen angulo interior affixo, hilo linearis longo, exostom. super. hilum proximo Pl. DLXXXV, A. Fig. III. *a* exostom. Radicula supera! brevissim.

Hab. Ad littoram, Ins. Madamaca inter Rhizophoreas: *March*, 1834.

Eriodendron.

Eriodendron anfractuosum.

Arbuscula (junior) cortice viridi ramis cum trunco stricte rectangulis, verticillat. fol.—?

Floribus ante fol. vel in ramos nudos racemosa, racemis abbrevatis, paucifloris. Pedicellis pedunculo 4-plo longiorib. bracteolat.

Cal. infundibulif. subæqualiter 5-dentat. dentium marginib. sphacelat. erectis, intus medium infra sericio-pilosa.

Pet. 5, lanceolata, basibus tubo staminео accretis, cum eo deciduis, lanceolato-obovatis sericeis, æstivatione contorta.

Stam. 5 basibus monadelphus petalisque accretis filam. longe filiform. Anth. medio affixæ maximæ, connectiv. album, loculis linearib. anfractuosis, 1-loculares.

Stylus filiformibus parte tubo stamineo inclusu tenuissima, parte exsert. crassa. Stigmato 5 quarum 1-solitar. minus, 2-aliis majoribus emarginatis e 2-connatis format.

Ovar. 5-loculare, axis abortive, e carpellis 5 verticillatis, 00 ovulatis, ovulis angulis intrant transverse affixis, foram. hilum prope.

Culta, circa Mergue: *Dec.* 1834.

An vere adelphi exantheris 3-4 adnatis?

Kydia.

Kydia jujubifolia, Gr. Pl. DXCV. Itinerary Notes, p. 108, *no.* 120.

Hab. Bootan.

ELATINACEÆ.

Anisadenia.

1. *Anisadenia Khasyana*, Gr. Pl. DXCIII. Fig. I.

Calyx (fructus sepalus) sepalis imbricatis, lanceolatis scarioso-chartaceis venoso-strictis, 2 exterioribus inter medium et apices utrinque glandulis 3-capitatis longe pedicellatis ciliatis intermedio secus marginem externum eodem numero glandularis longitudinaliter stipato, 2 intimis magis membranaceis e glandulosis, subeveniis.

The 3 exterior veins terminate in the glands! or at least at their origin. The intermediate sepal has only conspicuous veins on the glandular sides! the inner half resembling the two inner sepals.

Corolla nulla.

Stam? monadelpha, alte connata in membranam persistentem capsulam amplei tentem 10-partitum, laciniis plano subulatis alternis majoribus, axi vasculosa donatis, alternis setaceis evasculosis.

Capsula oblonga, apice stylos 3, basibus exceptis *marcesentis* coronata, abortione 1-locularis, 1-sperma, membranacea levi-

ter sex-striata, indehiscens? 3-locularis, loculis uniovulatis.

The remains of a placenta, and two other cells each containing a single pendulous ovula, may be found towards the apex of the fruit.

Semen unicum, pendulum, magnum, exalbuminos. Testa membranacea tenuissima, raphe in linearib. nec clavata, chalaza inconspicua macula parva brunnea.

Tegumentum interius crassum, carnosum albumen mentiens.

Embryo inversus, viridis. Radicula supera brevis conica hilum prope.

Cotyledones plano-convexiusculæ, carnosæ, acumbentibus vel faciebus veris seminis oppositæ. Plumula inconspicua.

Hab. Legi fructifera tantum in rupibus calcareis inter Mamloo et Churra Pungee Collum Khasyensium: *Oct. 27th*, 1835. Itinerary Notes, p. 38. *no.* 623.

a Seed viewed on its raphal face, *b* capsule, *c* seed, *d* abortive ovule, *e* long section of seed, *f* Embryo, *g* one cotyledon removed, *h* fruit, *i* ditto, *j* apex of a cell of the capsule, *k* apex of capsula, *l* capsula and column of stamens, *m* portion of staminal column, *n* one of the innermost sepals, *o* portion of outer coat with raphe, *p* intermediate sepal.

2. *Anisadenia pubescens*, Gr. Pl. DXCIII. Fig. II. Itinerary Notes, p. 54, *no.* 833.

POLYGALACEÆ.

Polygala.

1. *Polygala arrillata*, Gr.

Frutex 6-8 pedalis, fol. oblongo-lanceolata acuminatis repandis deorsum curvatis.

Racemis nutantibus multifloris. Sepalo postico quam maxime gibbosa, quasi galeato, aurantiaceus. Alæ oblongæ, dimid. superum, coloris sepali postico-inferum luteum. Carina lutea crista fusco-lutea.

Stam. 8, cupula hypogyna ovarii basin cingit. Capsula obcordato-reniformis, marginata carnosa, purpurea, bilocularis, bivalvis.

Semen 1 cuique loculo, pendulum, arilla maxime cupulata superne fissa aurantiacea semen dimidio exsertum, globosum membrana duplex. Radicula brevissime supera. Cotyledones carnosæ plano-convexa accumbentes.

Hab. In humidis Cherra Poonjee: *Oct.* 11*th*, 1835.

2. *Polygalæ* sp. Pl. DXCVII. Itinerary Notes, p. 170, *no.* 867. (The anatomy only.)

1. Alabastrum.
2. Flower.
3. Do. one of the alæ removed, *b* shews the insertion of one of the upper petals.
4. Flower laid open longitudinally, alæ and posterior sepal removed.
5. Carina and petals, or rather corolla, sepals removed.
6. Alternation of parts. 6*a*. Portion of the middle lobe of the carina or crest, some of the partial processes have no vessels.
7. Stamina.
8. Pollen in the dry state. 8*a*. Do. in water.
9. Pistillum.
10. Ovary long section of, wall of one cell cut away.
11. Apex of style shewing the two stigmata.
12. Stigma from a young bud, 12. Some more advanced.
13. Ovulum.
14. Long section of pistilla, shewing the mode of fecundation, one ovulum displaced, remains attached by the boyau.
15. Pollen with their boyaux.
16. Ovulum with a mass of boyaux.
17. Long section of the ovulum shewing that the boyau reaches the nucleus. 17*a*. Do. 17*b*. Apex of the nucleus, sphacelated with boyau.

18, 18*a*. Ovule more advanced. 18*b*. Same longit. section.
19. Ovule more advanced. 19*a*. Longit section through secundine and nucleus. 19*b*. Young embryo.
20. Very young ovulum.

3. *Polygalæ* sp. Pl. DXCVII. Plant nat. size (not the anatomy.)

Caule basi subterete cæterum angulato virid. axes inflorescentiæ trigonæ.

Calyx viridescens, alæ rosaceæ demum albidæ fusco-venosæ. Bracteæ ternæ cuique alabast. fuscæ caducæ, flores ante anthesin cernui.

Hab. Burmah. In campis elevatis Carmein versus. Delvi ad Carmein : *April 2nd*, 1837.

Xanthophyllum.

Xanthophyllum eglandulosum, Gr. Pl. DXCVIII. Fig. IV.

Arbor humilis, fol. exstipulatis oblongis coriaceis integris, acuminatis. Paniculis axillaribus terminalibusque. Pedicellis basi 3-bracteatis, sepalis irregularibus, 5to postico. Pet. alba demum luteo-fuscescentia.

Cor. 5-petala. Pet. 4 spathulata 2 superiore macula aurantiacea 5to (vexilla ?) carinæformi.

Stam. 2 obtegente, villoso pubescente, late obovato emarginato, stam. 8 libera, 6 petalis opposita adnataque, 4 nempe petalis, 4 superiorib. 2 petalo antico, 2 sepalis lateral opposit. Filam. complanato subulato pubescent. Anth. erectæ pubescent. bilocul. longit. dehiscent.

Discus perigynus sublobatus inter stamen ovariumque. Ovar. subglobosum, breve stipulat. stipite libero.

Stylus subulat. pilosus stigma capitat. 1-loculare, ovulis plurib. placenta 2 lateralibus sinistrorsis dextrorsisque affixis foramen hilum prope conspicuum.

Hab. In sylvis Mergue : *March*, 1835.

1. *Salomonia parasitica*, Gr.

Herba pallide brunnea, 2-8 uncialis simplex ramosave. Fol. 0, sed squamæ lanceolatæ alternæ pallide brunneæ. Racemis densifloris spicæformibus terminalibus floribus minutis albidis.

Cal. inferus, 5-sepalus, sepalis subæqualibus ovato-oblongis oblongisve apicibus breviter ciliatis.

Cor. 3-petala, pet. 2 lateralibus oblongis, acutis 1-nerviis; infra medium tuboque staminео adnatis, Pet. intermed. anticum naviculare cucullat. nervo 1 centrali genitalia fovens.

Stam. 5 monadelpha hypogyna, filamenta unita in tubum, petalis adnata stylum amplectent. convoluta libera facta brevessima. Anth. terminales ovatæ 1-loculares, introrsæ, longit. dehiscent. Pollen magnum parcum ovatum.

Stylus filiformis, tubo stamine paulo longior. Stigma captatum. Ovarium biloculare. Glandula hypogyna brunnea hanc ovarium site.

Ovar. complanatum subobcordatum loculis 1-ovulatis, ovulis pendulis calyce tecta.

Capsula reniformis nuda nec cristato 9-locularis, loculis 1-spermis, sem. pendula testa atra. Embryo minutus cellulosus, radicula brevi subobtusa. Hilo obscure, plumula inconspicua; albumen carnosum.

The radicle looks towards the apex of the ovarium, it is not turned towards the hilum. Pl. DXCVIII. Fig. V.

Hab. Mergue. In bambusaceis. Palar: *Oct.* 1834.

Parasitica ad pedes Bambusarum inter decayed wood frequentius.

2. *Salomoniæ* sp.

Herba erecta pubescens, 2-4 uncialis ramosa, caule racemisque obscure angulatis foliis late ovatis mucronato-apiculatis in petiol. $\frac{1}{2}$ unciali decurrentibus, attenuatis, rugosulis ciliatis. Racemis terminalibus, floribus minutis læte rubris (rosaceis).

Salomonia.

Sepalis ovatis unico majore emarginata.
Alæ oblongo-obovatæ concavæ.
Carinæ lobi laterales rosacei medio aureo.
Anth. 7 an semper.
Capsula suborbicularis, compressa e cristata.
Hab. Khasyah Mounts. Moflong Downs: *Nov. 7th*, 1835.

3. *Salomonia* sp.

Erecta ramosa caule 3-alato, foliis breviter petiolatis cordatis mucronatis repandis 5-nerviis, spicis terminalibus multifloris capsulis cristata dentata, dentibus 2 serialibus.

Cal. 5-sep. sepal. ascendent.

Cor. gamopet. irregularis seperne fissa, 3-loba, lobis lateralibus oblongis intus pilosis, intermedio cucullato, genitalia obtegente utrinque denticulato, dente carnosa.

Filam. dilatatum e basin lobi medii corollæ. Anth. sessiles 6, 1-loculi.

Ovarium biloculare, loculis 1-ovulatis, ovulis erectis. Stylus subclavatus basin contortus. Stigma capitatum.

Hab. In humidis arenosis Mergue.

4. *Salomonia angulata*, Gr. Pl. DLXXXV. A. Fig. XVI.

Herba pusilla, spithamea. Caulis ramosus 3-angulatis, sulcatis. Folia pauca, alterna, ovata, subsessilia, integra cum mucrone glabra inferiora fere squamiformia, flores spicati, minute purpuriæ apicæ multifloræ, terminales angulatæ.

Cal. profunde 5-partit. sepalis linearibus acutis, ascendentibus.

Cor. gamopet. irregularis 3-loba, lobis lateralibus minorib. oblongis, obtusis, medio obtusissimo, calceolariformi genitalia obcludente.

Stam. 1-delpha. Antheræ 4 ovatæ, 1-loculares, vel 2, biloculares. Filamenta in tubum stylum amplectentem accreta.

Ovarium biloc. margine cristato-dentatis, loculis 1-spermis stylus basi carvatus filiformis.

Stigma subcapitat. Pericarpium margine utrinque cristato-dentatum 2-spermum 2-loculare. Semina ovata, pendula. Arillus 0, albumen carnosum. Cotyledones plani. Plumula inconspicua. Radicula ad hilum versa.

Hab. In palude prope Moulmein : *Dec.* 1833.

An nova sp. Salomonia angulata. Glabra erecta ramosa, caule ramisque angulatis sulcatis foliis ovatis, subsessilib. mucronatis, capsulis margine cristato-dentatis.

ÆSCULACEÆ.

Æsculus.

Æsculus assamicus, Gr.

Arbor humilis formosa, umbrosa, cortex ramulorum læviuscula grisea, tereticellis hinc illinc exasperula.

Folia opposita vel subopposita in ramis articulatim septenatim palmatim composita. Petiolis commune spithamæi, vel ultra utrinque incrassata teretiuscula.

Foliola breviter petiolulatim in apicem petioli articulata oblongo-lanceolata interdum oblongo-obovata cuspidato-acuminata obtusa, irregulariter serrata glabra subcoriacea pulcherrime lucido rubro-punctata; v. secundariæ conspicue arcuatæ, sed non immediate confluentes, interveniis reticulatis. Racemi terminales paniculatum pedalis vel fere bipedales oblongo-conici, erecti inflorescente centripet. Flores parvi.

Cal. tubulos apice 5-dentatus dentibus rotundatis erectis æstivatione imbricatis erectis.

Pet. 4 (antico deficiente) unguiculata, limbis rotundatis repandis albis 2 posticis ungues versus aurantiaceo-tinctis; in corollam basi tubulosa irregularia subascendentim disposita.

Stam. 7 hypogyna. Filam. subulata longe declinata. Anth. versatiles bilocul. longit. dehiscent. Connectivo lineare anguste, ultra loculos breviter product.

Torus antica deficiens carnosus inter petala et stamina situs.

Ovar. pubescens, cylindracea, 4-angulata, 4-loculare, (vix semper obfructus semper 3 valvat.) stylus conicus brevissimus, stigma simplex ovula pendula apices loculorum versus sita, in loculis solitaria? tegmentis interioris apicem mammiliform longiuscule exserta.

Fructus oblongo-ovatus interdum obovatus, magnitude varius (the size of a duck's egg) cernus, pedunculus crassus sublignosus, obsolete squamatus terminalis, 4 loculares, 1-sperma. Extus saturate ferrugineis verrucis caducis crebris vestito, apice mammillatis, 3-valvis coriaceis, intus celluloso-spongiosis, sæpe fili plures intus ad sunt hinc illinc, tactu saponacea ovula abortive serentes.

Semen maxim. fructus cavitata exacte replens, extus tactu saponacea. Testa cinerea, lævis, (hilum oblongo-lineare maximum saturatum castaneo-brunneum, lucidium), crassa, intus brunnea, ligneo coriacea intus membrana tenuiscula castaneo-brunnea adhærente vestita.

Cotyledones sem. exacte replens, in unicum connat. tegmenti adnatæ. Radicula omnino externa, inter canalem cotyledonum recepta, curvata magna, apice hili basin angustatæ respondente, tegmento non adhærent.

Plumula inconspicua.

Hab. In regione assamica alta in humidis habitat. Vulgatim occurrit ad ripas rivuli Monmoo Negrogam prope.

Foliolis septenalis lanceolatis oblonga irregulariter serratis, staminibus declinatis corolla 4-petala longioribus, fructibus oblongis, ferrugineis verrucosis.

Hippocastaneæ.

Hippocastaneæ sp.

Flores racemosi parvi vex conspicui. Racemi in panicula pedalem vel ultra erectam a basi ad apicem florentum conicam disposita.

Cal. tubulosus, apice 5-dentatus dentibus rotundatis æstivatione imbricatis erectis.

Pet. 4, hypogyna sepalis alternantia, corolla basi tubulosa, irregularem subascendentem disposita, unguiculata antico deficienta, limbo rotundato repando alba, 2, postica præsertim ungues versus, aurantiaceo-tincta.

Stam. 7 hypogyna, filam. subulata longa declinata alba. Antheræ versatiles biloculares, longitud. dehiscentes connectivum lineare angustum ultra loculos in processum brevem. obtusum product.

Torus postice developed crassus carnosus antice deficiens inter stamina petalaque.

Ovarium pubescens aspectu cylindraceum 4-angulatum, 3-linearum longitud. Stylus conicus brevissimis. Stigma simplexi 4-loculare in septis cruciatis.

Ovula pendula, apicem loculorum versus sita, ovarii situs ovulifer decoloratus brunneo-pallidissime tinctus, 1 cuique loculo, unico tantum fecundato, orthotropa, apice secundinii celluloso mammillato longiuscule exsertum.

Arbor mediocris formosa. Fol. pulcherrime lucida, juniora rubro-tincta, palmata obovata serrata. Paniculæ erectæ conicæ. Pl. DLXXXII. Fig. 3.

Hab. Upper Assam. Legi primum apud. Selani Mookh: *Dec.* 1835, vulgatim occurrit secus ripas rivulorum humidorumque. Suddyum circa præsertim fluminis Mammoo.

SAPINDACEÆ.

Cardiopteris.

Cardiopteris hamulosa, Pl. DXCVIII. Figs. I. II. III.

Flores polygami. Hermaph. sepala 5, basibus coalita ovata breviter inciso-ciliata æstivatione imbricata.

Cor. gamopetala hypogyna rotata profunde 5-partita, laciniis ovato-lanceolatis sepala excedentibus venosis sub integris æstivatione imbricatis.

Stam. 5 libera epipetala filam. brevia sinubus laciniarum corollinarum insert. Anth. erectæ biloculares longitud. dehiscentes, sub introrsæ cellulæ fibrosæ sub obsoletæ. Pollen læve.

Stylus lateralis curvatus brevis, stigma capitato-peltatum in corpus oblongum papillosum emarginatum.

Ovarium conicum basin ampliatum 1-loculare, 2-ovulat. (an 3 interdem.) Ovula pendula ab apicem loculi. Stigmatis basin opposit. tegumentum unicum exterius.

Fæm. Cal. ut in hermaph.

Cor. 0. Ovar. ut supra tenuissimum vasculare foramina ante anthesin inconspicuo hilum prope foraminatum. Nucleus inversus quoad tegument.

Capsula bialata, alis corporibus 2 unitis (stigmata abortiva alternantibus, linea clavata iisdem utrinque opposita (an loculi abortientes.)

Corpora cellulosa apicibus breve mucronatis, vasor. fasciculis binis donata.

Ovulo dimidium maturato, cavitasin nucleo centro ad est. Nucleus cellulosus laxus cellula cuique Nucellus grumosus centralis.

Flores expansos non vidi. Alabastra hermaphrodit. sub globosa fæmin. ovato-conica.

Calcutta: *June*, 1835.

The same.

Capsula ovato-obcordata breve stipitata, calyce 5-sepalo persistente stipato, emarginata valde compressa bi-alata bicarinata, carina nempe obtusa utrinque in alis alternante, sicca, 1-locularis margine alarum incrassata, carinisque in stipitem decurrentibus.

Semen unicum pendulum ex apice loculi ope funicula brevis, linearis, compressa, pluri gramineo haud ab simile, angulata caryopside.

Tegumentum simplex membranaceum tenuissimum, albumeu aricte vestiens et vix separabile, fasciculis vasorum pluribus ad apicem usque currentibus.

Albumen copiosum corneum per oleosum tegumento conforma.

Embryo in axi albuminis antitropus.

Radicula teres longissima subacuta.

Cotyledones lanceolatæ foliaceæ trinerves, nervis utrinque prominentibus lateralibus paulo abbreviatis faciebus interna contiguis.

Plumula inconspicua, vix punctulum formans.

Fig. I.

1. Female flower of Cardiopteris hamulosa, opened artificially.
2. Do. Ovarium, Style and Stigma.
3. Do. opened shewing one pendulous ovula.

3*a*. 4, Do. various views.

5. View of Stigma and the two modified styles.
1. Alabastrum of hermaph. flower.
2. Do. opened.
6. Introrsous view of Stamen.
7. Ovula one of which is becoming abortive.

Fig. II.

1. Female flower-more advanced.
2. Do. its ovula.
3. Ovula in a younger state.
4. Ovulum in situ. (more advanced), with part of the Ovarium and the Style and Stigma.
5. Same ovule, *a*, exostome.
6. Immature fruit from which the above was taken.

Fig. III.

1. Somewhat advanced ovary (of a female flower).
2. Mature carpella.
3. Ditto part of.
4. Mature seed.
5. Transverse section of fruit.
6. Ditto of seed.

7. Longitudinal section of seed before it has been placed in the ground; embryo much too distinct.
8. Seed after having been planted.

8*a*. 9, Embryo of ditto detached.

Obs. It is remarkable, that a short time after the fall of the corolla, the foramen or what seems very like it is opposite the hilum, the ovule presenting here a decided aperture, the margins of which are truncated, while projecting beyond this is a remarkably fine membrane, which I consider to be primine, and external, although it is difficult to prove this at this stage of its development. Examined at a later stage the ovule will be found to be curved on its own axis, the integument at this period appears to adhere to the body of the nucleus in small nipple-shaped processes which appear to indicate the normal number of ovula to be three.

It is most remarkable that in apparently perfectly developed seeds, during the dry state, I have not been able to trace any vestige of embryo. The albumen presents a slight difference in its tissue along the middle line; but this is scarcely appreciable. The annexed drawings of the embryo were made from 2 seeds that had been placed in the ground some time.

Can there be some plants which may be truly called Cryptembryoneæ ?

The testa is considerably vascular, the cords running along the angles or eminences, they are chiefly composed of ducts which however are unrollable.

There is a curious but rather strong resemblance between the outside of the testa and the cotyledons, as will be seen by looking at the sketches.

Quoad affinitas, habitu Cardiospermeo (Sapindacearum) accidit, structura fructus et embryonis Hireæ (Malpighiacearum) cujus familiæ exemplo unico Stigmatophyllo aristato habitu etiam affinis est. Vidi Bot. Reg. t. 1659. Roxb. Hort. Beng. p. 34, sub nomine Banisteriæ auriculatæ

2. *Cardiospermum Halicacabum.*

Flower of very irregular structure, and rendered still more difficult by dislocation.

Sepals 4, in reality 5, the two lowest combined into one, as is evident by the rudimentary central veins when compared with its opposite single one; these are anterior and posterior, the two outside ones are very small.

Petals 4, that which would be opposite to the compound Sepal being wanting, the others are normally situated, each being provided with a scale on the inside, two of which have a greater tendency to pass into stamens than the rest.

Fertile stamens 8, disposed nearly in two phalanges, of these 5 are opposed to the sepals, three are opposed to the compound one, two belonging to it, the middle one to the petal wanting. The remaining two are opposed to the lowest petals, or those between the compound sepal and the lateral ones. The two remaining to complete the series will be found in the shape of two minute teeth opposed to the two remaining petals.

Carpellary leaves three opposed to the wanting petal, and those two which have no fertile stamina.

Alternation and situation of parts. Pl. DXCIX. Fig. III.

d, Abortive Stamens.

c, Sepal.

b, Petal with its scale.

a, Compound.

A system of compensation is visible. The stamen opposed to the wanting petal is most developed; the two petals whose scales have the most antheriform tendency have none but tooth-like stamina. And if the situation (given) of the carpella be correct, we have them developed opposite those parts which are most deficient.

Little is known of the nature of these and other scales, if they represent a series of stamina, then the outermost series

is obviously wanting. In this case the number of stamina will be 20.

Again if the carpella invariably alternate with the inner row of stamina, another series is wanting, which like the outer, would be opposed to the sepals, and will be 25.

1. Sepals.
2. Petals.
3. Stamina—wanting.
4. Stamina—Scales.
5. Stamina—developed
6. Stamina—3, developed, 2 sterile.
7. Stamina—wanting.
8. Carpella—3 developed.

A tendency or relation of analogy is presented to a Polyganous formation.

Puddo river.: *Sept.* 10*th*, 1837.

Euphora.

Euphora exstipulatis, Gr.

Arbuscula elegans 2, 5 pedalis. Ligno duro ramulis petiolis petiolulis nervis mediis subtus ferrugineo-rubiginosis, fol. alternis exstipulatis 5, 6 jugis cum impari, fol. oblongo-lanceolatis acuminatis repandis subtus ferrugineo-pubescent. pubescente stellar vernatio conduplicat. fructibus racemoso-paniculatis (paniculis axillaribus) globosis cerasi magnitudinum, extus pubescente stellarum minutissime velutinis. Capsularibus 1-locular. 1-spermis.

Semen baccat. lateri fructus affixis, hilo lineari 1 $\frac{1}{2}$ lineali pars baccata an testa an arillus, evasculosa gelatinosa membran. interior tenuissime nervosa.

Cotyledon. crassissime carnosæ fusco-lutescent. anticæ posticæque quoad exin.

Radicula inclusa hilo obversa barbata.

Plumula inconspicua conica subabuluta. Sapor testæ inegratus acidus.

Hab. Mergue. In sylvis colloris. Pator prope basin. *Feb.* 1835. flores non viridi.

Obs. Testa secus hilum longitudinaliter sulcata tinca a radiculæ basi ad hilum cotyledones notat.

Pars baccata testa est ob cohæsione cum membrana vasculosa interna, ob cotyledones hôc membrana tectæ nec membrana propria, ob ejus continentata fructus fructibus *Litchi* certe affinibus.

Dodonæa.

Dodonæa pentandra.

Hermaphrodita viscosa. Fruticosa ramulis angulatis foliis breviter petiolatis obovato-lanceolatis obtusis. sub integris marginibus revolutis. Paniculis terminal. racemosis foliorum circiter longitudinis, floribus sub cernuus sæpius 2 in ramulis quoque panicula inconspicuis viridibus.

Cal. 5-sepalus.

Stam. 5 subsessilia sepalis alterne ovaria compress.

Stylus brevis stigma exsertim emarginat. utrinque longitud. 1-sulcatum. fructibus inflatis. 2-alatis 2-locul. loculis 1-spermis.

Sem. rotundis pendulis. Radicula hilum prope. Cotyledonib. more helicis tortæ albumeno.

Hab. Mergue. In littoribus arenosis: *Oct*, 1834.

Sapindus.

Sapindus rubiginosus.

Arbor ramulis petiolis pedunculisque ferrugineo-pubescent. fol. alternis pinnatis 6-jugis (foliis terminalis 1 interdem abortient.) foliolis oblongis acuminatis repandis penninerviis utrinque pubescent. impunctatis petiolulis ferrugineo-pubescens.

Paniculis terminalibus sub racemosis, ramis divaricatis floribus parvis, inconspicuis suaviter odoratis.

Cal. 5-sepal. sepalis rotundatis valde inæqualib. 2 exterior minoribus.

Pet. 4 hypogyna breviter unico unguiculata sepalis alternantia obovata concave basin versus ciliata laminata, lamina intus medium versus densissima barbat. medium supra constricta.

Stam. 8, hypogyna hinc dejecta filam. sublatis villosissium.

Anth. bilocular, longit. lateraliterque dehiscent.

Pollen obsolete triangulare.

Ovarium superum forme corporis centralis pilosi tunque rudinem. Petalum inter sepala 2 inferior si 2 exteriore (uti videntur) recte sinistraque sunt abortiens.

Torus superne vel postice in glandulos alba sub lobala product. Ovarium extus sericeo-pubescens, profunde 3-lobum. Stylus filiformis inclusus apice 3-fidus. Stigmata 3, acuta 3-loculare loculis oblique ascendentibus, 1-ovulatis, ovulis ascendentibus foramen hilum prope fundum locul. versus spectans.

Hab. Mergue. Ancutta: *Nov.* 1834.

Obs. The two smaller sepals in the bud are anticous and posticous, the petal corresponding to the two right sepals is wanting. The shorter stamens, are anticously situated, the whole of them with the ovary or its rudiment is pushed down by the development of the torus posticously, the hairs of the lamina of the petals and of the stamens resemble closely some forms of dotted ducts. The pores, or adhering granules are very minute and require a high power to define them clearly. The ciliæ of the petals are similarly formed, but the pores are less highly developed. According to Cambessedes the anticous petal is wanting.

Nephelium.

Nephelium malaiense, Gr.

Ramulis. paniculis foliisque subtus ferrugin. pubescent.

petiolis flexuosis, foliolis 6, 7 alternis lanceolato vel ovato-oblongis, accuminatis coriaceis supra atro-viridibus venis 2-dariis distinctis ramulis transversis nexis.

Floribus fasciculatis fasciculis racemosum, racemis paniculatis dispositis terminalibus.

Pedicelli breves. Calyx basi planus sepalis erectis subæqual. late ovates breve ferrugin. puberul.

Annulum breve evoluta pubescens inter sepala et stamin. in hoc (outer edge of petal) inseruntur.

Pet. valde inæqualia utrinque sed præsertim intus villosa, barbata breviter unguiculata spathulata vel obovata sepalis paullo longior.

Stam. 8-intra annulum insert. Filam stricte petalor. longitudine albo-pilosa. Anth. erectæ basin affixæ bilocular. longit. dehiscentes.

Rudim. fæm. pubescenti-pilos. central. stigmata 2 sessili loculi 2, ovule abortive.

Fl. fæmineus mari similis sed stam. quamvis antherifere, forsan effæte sunt.

Ovar. ferrugin. pilos subdidymæ, stylus brevis pubescens apice bicrus, cruribus patentibus, interne stigmatosis, ovula 1-cuique lobo vel loculo ascendens anatrope foramen inferne spectans latus rapheos placent. proximum arillo carnosa.

HAB. Malacca at Malim Euphoriæ or Nephelii sp. Malay name *Matakuching*.

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1. *Sapinadeæ* sp. Pl. DXCIX. Fig. I.

Arbor. Folia impari pinnata.

Fructus racemosi oblongi ovi magnitudine, extus processubus conicis angulatis, supra in stylum productis echinatissime epicarpium crassum, intus subviscosum, endocarpium album lucidum chartaceum vix separabilum 1-loculares.

Semen unicum cavitatem fructus implens, magnum erectum, (hilo lato) sessile.

Arillus carnoso-baccatus crassus albus, testæ, apicem hujus exceptum insuper qua apertus est, arcte adhærens, acidus.

Tegumentum unicum, lignosum, venosum, fragile apice sphacelatum, intus spongiosum et membrana vix separabili sponte vestitum, albumen nullum.

Embryo magnus, inversus, radicula supera brevissima obtuse. Cotyledons crassissimæ carnosæ.

Plumula subinconspicua.

1. Fruit natural size.
2. Do. section longitudinal, *a* epicarp, *b* endocarp white glistening, surface irregular, *c* fleshy baccate white arillus, *d* covering of the seed, *e* sphacelated micropyle, *f* embryo.
3. Seed separated.
4. Do. arillus detached, *a* micropyle.
5. Embryo.
6. Cotyledon radicle and plumula.

Hab. Burmah, In cola mont. Bamo propinq. orientem versus: *May 4th*, 1837.

2. *Sapindaceæ* sp. Pl. DXCIX. Fig. II. Itinerary Notes, p. 112, *no.* 163.

Hab. Bootan.

TERNSTRŒMIACEÆ.

General Remarks on the Tea Plant.

The aspect of the specimens of the Tea-growing plant of China in my collection, is so different from that of the Assam plant, that I was naturally led to enquire, (so far as my means would go,) whether the Assam plant is identical with that of China or not.

With the view of determining this point I have examined a large collection of the Assam plant, made by Mr. Masters, a tolerably complete series of flowering specimens of the China plants cultivated in Assam, from the same gentleman, specimens of the Tea plant cultivated in Chusan which are only in bud, and lastly the living plant as it exists in the garden of the estate of Pringitt near Malacca.

The following are the principal differences of each of the above :—

Assam plant.—Stature large, parts distant, leaves very large, very acuminate or cuspidately acuminate, occasionally acute, in the dried state blackish, and not of a leathery appearance. Leaves of the calyx smooth, except the margins which are ciliately pubescent, veins of the petals complete, ovarium quite smooth or slightly pubescent. Branches of the style dilated at the apex. Radicle of the embryo small, and plumule large.

China plant cultivated in Assam.—Stature smaller and much more contracted. Leaves much smaller, obtusely acuminate, and of pale leathery appearance, leaves of the calyx ciliately pubescent, ovarium densely silky-pubescent.

The Chusan plant, is very dwarf and contracted, leaves small, obtuse or obtusely acuminate, blackish and not of a leathery appearance, leaves of the calyx ciliately pubescent. Ovarium densely silky-pubescent.

The living plants at Pringitt.—Stature contracted and dense. Leaves very small, always obtuse, generally emarginate, light green, of a leathery appearance. Leaves of the calyx pubescent. Connectives of the anthers broad and emarginate, ovary densely sericeo-villous. Branches of the style undilated at the apex. Cotyledons unequally auriculate at the base, one of the auricles covering the apex of the large radicle, plumule small.

All agree in the nodding direction of the flowers, the bracteation of the pedicels, the three-celled ovarium with 4 ovula to each cell, the tri-partite style, and the comparatively little protected buds.

Although, as I have said, the Assam indigenous plants have a very different appearance from those Chusan, to which however they approach nearer than to the others, there are perhaps sufficient gradations to explain away several of the differences. But whether this will apply to the uniformly large, acuminated, and not unfrequently acute leaves of the Assam plant, to its smooth, or nearly smooth ovarium, is more than I would venture to pronounce; and I would be equally reserved, regarding the pubescence of the calyx, the undilated ends of the branches of the style, and the consequent punctiform line of spathulate stigmatic surfaces, the unequal auriculation of the cotyledons, and the inversion in size of the plumule and radicle.

There can be no doubt that if specimens of each of the above, (excepting perhaps the Chinese plants cultivated in Assam, and the Pringitt plants, which are much alike), were to find their way into an Herbarium, and were not known to belong to a genus that has been cultivated from time immemorial, they would be admitted to be distinct by the majority of Botanists.

CAMELLIA.

The Genus is divisible into two Sections.

THEA. Calyce minus imbricato. Gemmis laxe et pauce squamatis.

CAMELLIA. Calyce imbricato in petalis gradatim abiens. Gemmis imbricatis.

1. *Camellia (Thea) Bohea*, Pl. DCII. Fig. I.

Flores in axillis solitarii, pedicellis petiolis duplo fere longioribus, deorsum curvatis medio articulatis, inter medium et apicem cicatric. bracteæ notat.

Cal. imbricatus sub 7-sepalus, quarum 2 internis intimoque cæteris, 3-4 plo major valde concava.

Pet. 5 rotundata, concava 2 exterior magis sepalina, dorso viridi-rubescente interior omnino alba.

Pet. 6ta interdum intimo minore.

Stam. 00, æstivatio flexuosa intima subinflexa. Filam. subulatis interiori breviora robustiora. Anth. subquadratæ. Connectivum carnosum latum basi medium usque quasi fiss. filam. in fissura parte inferior affix.

Anth. locul. marginatis, centro dehiscent.

Stylus robustus ad medium fere ex apicem 3-sulcatus stamen longiorib. paullo brevior, apice 3-radiatus, radius centro sulcatis, sulco stigmatosa et apice *subcapitat.* stylus infra medium pubescens.

Ovar. infra med. sulcato-angulat. sericeo-pilosum præsertim apice toro glanduloso insidens, ovula 4 perparia collateralia superposita, raphe superi infera, inferi supera, foram. conspicue axin spectant.

Capsula castaneo-brunnea basi calyce nunc e sepalis 5 imbricatis subæqual. rotundatis subcoriacea, parietibus crassiuscule 3-locularis, rounded 3-lobed.

Semen 1 cuique lobo, subglobos. castaneum glabrum læve, hilo magno,rotundato, hinc foveolis 3 ob pressione ovulor. abortivor. supra mammilla. minute.

Testa e lamellis 2 extus castan. osseum, intus albidum coriaceo-carnos. vascular layer interjected.

Tegument. interius tenuiss. membranaceus. Cotyledones hæmis phærici, radicula inclusa ob auricul. cotyledon. hilum latus inferius spectans.

1. Branch natural size, 1*a* mature cauline leaf.
2. Flower in front, 1*b* bud back of.
3. Do. laterally.
4. Anther back.
5. Do. front.
6. Do. obliquely.
7. Pistillum.
8. Apex of style and the stigmata.
9. Ovarium, 1 cell laid open.

10. Transverse of do.
11. Ovulum under slight pressure.
12. Disposition of two of the ovules of a cell.
13. Fruit, rarely so perfect as this.
14. Seed.
15. Hilum, face of do. the dots are the impressions of the barren ovula.
16. Long section of seed, *a* outer coat of two layers, one hard and bony, the other cellular coriaceous and vascular, *b* exceedingly fine envelope to the seed, *c* cotyledons, *d* radicle.
17. Half an embryo, *i. e.* one cotyledon removed intended to shew the auriculation of the cotyledons.
18. Do. part of cotyledons separated, these are unequal at the base and one is subcucullate.

This drawing was made while making a comparison between the Assam and China Tea plants, and was taken from living plants in the Pringitt garden.

The disposition of the placentæ and ovula are curious, the former are confined to the middle of each cell, being produced outwards into the centre of the cell, and bearing on its apex two ovules; the upper one erect, and lower pendulous. The raphe of both ovula is on that side of the ovulum next the parietes of the cell.

The result when both ovula are matured, is that two anatropous seeds of which one is erect and pendulous, have the radicles pointing exactly towards each other.

Obs. The Chinese plants cultivated in Assam, preserve most of these characters, especially the coriaceous, scarcely acuminate leaves, and pubescent ovary, and non-dilated stigmatic apices.

They tend to pass into the Assam one in elongation, smooth but ciliate sepals and length of style.

The Chusan specimens have the dwarf habit, but the leaves are not more coriaceous than those of the Assam spe-

cimens, some also tend to be lanceolate acuminate, but still retain their bluntness, the calyx is not even ciliate.

The permanent points are, curved pedicels annulate about the centre, blunt leaves, this tendency seems to disappear in the Assam plants. especially those which are caudate acuminate.

The plant from which the above is taken has been introduced into Pringitt's Garden, it there forms a densely branched rather ragged shrub of 3-4 ft. in height.

The leaves are very coriaceous serrated subacuminate, patent recurved convex above, margins subrecurved.

The length is equal to two breadths; flowers solitary or two axillary nodding subsecund, pedicel annulate articule about the middle, with one bractea above.

Calyx shortly pubescent, and ciliate, corolla separating with the stamina, adhering, but separable without laceration.

Bud-scales sericeous, perhaps not exceeding 3, much like a leaf, vernation conduplicate margin once involute.

The differences between it and the Assam plant are in habit, all the parts being here approximated not distant: small, very coriaceous scarcely acuminate leaves, a less bracteate pedicel, pubescent calyx, pubescence of ovarium.

Emarginate connective, stout and shorter style, stigmata punctiform at the apex of the branches.

Direction of the ovula, non-auriculate cotyledons, and non-included radicle, long radicle, and small plumule.

In both the pedicels are annulate, not articulate, the annulus arising from the scar of 2 confluent bractes which in the Tea *open spathiformly*. Pl. DCII. Fig. II.

Assam indigenous Tea Plant.

Stature large, parts distant. Leaves very large, in the dried state black and not of a leathery appearance, very acuminate or cuspidato-acuminate occasionally acute, flowers axillary nodding, pedicel of expanded flower annulate scar about the middle, leaves of the calyx smooth, except the ciliated pubes-

cent margins. Petals with perfect veins, connective of the anthers narrow.

Ovarium very slightly pubescent or quite smooth. Style tripartite, lacinie generally with a recurved apex, and there dilated and stigmatose ; ovula one.

Cotyledons inauriculate plumule large.

Assam Chinese imported plants.

Stature smaller, and much more contracted than native Assam plants. Leaves much smaller, pale with a leathery appearance, lanceolate obtusely acuminate. Pedicels, calyx, corolla and stamen as in the Assam plant.

Ovarium densely pubescent. Ovula 4 to each cell, style tripartite subdilated at the apex and stigmatose there.

Fruit not seen.

Chusan plants in the collection.

Very dwarf and contracted leaves tending to be obovate, small, of the black unleathery appearance of the Assam plant. Pedicels and calyx as in that.

Ovarium densely pubescent.

Pringitt plants.

Stature contracted, dense, leaves very small, light-greenish leathery lanceolate always obtuse generally emarginate. Pedicels as before, calyx pubescent. Petals veins not reaching to the margin. Connective dilated emarginate.

Ovarium densely sericeo-villous, style 3-partite. Branches radiating, with a punctiform stigma on the undilated apex of each.

Cotyledons unequally auriculate at the base, one hooded, radicle large, plumula small.

Assam leaves always have a thin appearance, I have not determined the absolute situation of the ovula, from dried specimens, owing to shrinking.

The China plants cultivated in Assam have as complete veins of the petals as the Assam wild plants.

Stigmata various, styles sometimes deeply bipartite, either spathulate at the apex or as in the Pringitt plants, but varies with 4 cells, to the ovary.

2. *Camellia* (*Thea*) *Theifera*, Gr. Pl. DCI. Figs. I. III.

Pedicelli pluri bracteati, bracteis basi latis sursum in sepalis abeuntibus.

Sepala 5-7 rotundata imbricata, petala 5-7 imbricata, ovalia vel rotundata, exteriora bracteis abeuntia, intima petaliformia pluri-venosa, intermedia marginibus membranaceis, basi inter se mediante filamentorum annulo adhærentia.

Stam. 00, hypogyna basin versus coalita inter se et cum petalis leviter cohærentia cæterum distincta.

Filam. filiformia glabra. Anth. introrsæ, basi affixæ biloculares longit. dehiscent. connectivo latiusculo.

Stylus filiformis hirsutiusculus apice tripartit. stigmata totidem reflexa, stylorum apicium facies internas occupant.

Ovarium globosum sursum in stylum productum pilis rigidis brevibus hirsutiusculum, 3-loculare, loculis 4-ovulatis.

Ovula biseriata 2 superiore externa ascendentia, foramen supero, 2 inferiore interne pendula foramine intus et deorsum spectante. Tegument utpote e siccis conspicere licet unicum, distinctnm.

Capsula 3-loba, coriacea, endocarpio tenuissimo membranacea loculicida, septis persistentibus ex axi centrali solutis, lobosum sinubus oppositis, 3-locularis loculis sæpius 1-raro 2 spermis.

Sem. pendula si singula globosa si bina hæmisphærica. Hilum magnum micropyle satis conspicuum, hili latere exterioris contiguam.

Testa coriaceo crustaceo crassiuscula. Tegument inter. membranacea tenuissime inter hoc et testam materies cellulosa vasis spiralibus et ductubus creberrimis interspersa. Semen exalbuminos. Cotyled. hæmisphæricæ. Radicula brevissima supera plumula conspicua.

Raphe externe inconspicua lata, apice seminis geometric apud in ramulo pluries dichotome ramosos dividens, ramis interior apice dichotomis binis extimis lateri exterior ramulos dichotomos emittentibus.

Hab. Upper Assam.

3. *Camellia* (*Thea*) *Mastersia* Gr.

Foliis lanceolatis, acuminatis vel cuspidato-acuminatis, coriaceis, serratis, venarum reticulatione inconspicua.

Floribus axillaribus vel terminalibus, solitariis vel 2-4 aggregatis, subsessilibus, ascendentibus, quasi e gemma ovata imbricatim-squamata erumpentibus.

Petalis liberis.

Staminibus subbiseriatis, basi leviter connexis.

Ovario villosissimo, loculis 3 4-ovulatis, stylo 3-partito-stigmatis linearibus.

Hab. Upper Assam.

Readily I think recognised by the highly bracteate short footstalks of the flowers, by their passing insensibly into the calyx and this again into the corolla.

Contained in a collection presented by Mr. Masters to Capt. Jenkins, by whom with his characteristic liberality it was placed at my disposal.

Making the 4 or 5 species of Camellia, indigenous to Assam. I have called it after Mr. Masters.

It may possibly be Camellia axillaris, Wall.

4. *Camellia caudata,* Gr. Pl. DCI. Fig. II.

Foliis anguste lanceolatis, caudato-acuminatis, filamentis monadelphis villosus antheris basi insertis.

Omnino ut in præcedente abeuntia bractearum in sepala et sepalorum in petala evidentissime. Filamenta interna distincta hypogyna, annulo hypogyno ovarii basin cingens insertim.

Pollen globoso-subtrigona, stylus obclavatus hirsutissima apice tripartit.

Ovarium sub 6-gonum hirsutum angulis alternis minus pro-

fundis loculis triovulatis, ovulis 2 superioribus collateralibus exterioribus, directio foraminis ut in antecedente.

Septis vix evidentibus sed dehiscentia ostenditum placenta una valvula centro unius semper adhærente. Vasa paginæ interioris testaquæ chartaceo-coriacea omnia spiralia cum interno tegumento-quod tenuissim. secedentibus.

Capsula rotundato-trigona, 1-sperma, 1-loculare, loculis 2 cum ovulis abortient. pressione, capsula exteriori pariete arcte applicitis; semen præcedentis sed minor.

Hab. In collibus Khasyensibus alt. 2500, 4500 ped. (especially on the Bengal side). In collibus Mishmeensibus, non raro ad pedis etiam, gradu lat. 28 descendit.

5. *Camellia simplicifolia,* Pl. DCIV. Fig. II. Itinerary Notes, p. 40, *no.* 652.

Hab. Khasyah Mountains.

Eusynaxis.

Eusynaxis Barringtonifolia, Gr. Pl. DCIII. Fig. I.

Fruticosa, foliis lanceolato-obovatis, cuspidato-acuminatis serratis, maturis spithamæis, alabastra gemmiformia subglobosis axillaribus solitariis sessilibus, floribus cernuis.

Calyx imbricatus sepalis exterioribus minorib. persistent.

Sepalis coriaceis rotundatis infimis multo minor massis persistentibus, reliquis sensim ampliatis interne serie subquinaria concava coriacea. Sepala extima bracteæve apiculato-mucronum.

Pet. totidem alternant. concava outermost very like the sepals, e intimo minima.

Stam. ∞, præsertim exterior qua breviora inter se coalita. Filam subulat. apice tenue. Anth. basin affixæ, connectivo ovato loculis marginal longit. dehiscent. Pollen extus striatulum, plicis porisve 3. Gemmatio Camelliæ Theæ.

Ovarium oblongo-conicum, subglabum 5-sulcatum.

Styli subulati torti totidem quot sulci ovarii basin usque fere discret. vel varie coaliti apice emarginati, *stigma inter-*

jecta, style split at the top to the dorsum, inside of the fissure and its edges stigmatiferous, loculis tot quot stylis, angustis, ovulis paucis appensis.

Fructus nutans, oblongo ovato, when dry hard with 5 obtuse inner angles, breviter pedicellato, pedicello crebre annulato basin nudus apice obtuse pentagonus imo apice cicat. 5-lobo. Epicarpio carnoso oleoso coriaceo, endocarpio-coriaceo, 5 vel abortu 4-locular.

Semina oblonga pauca 1-2 cuivis loculo, angulo interiori affixa, brunnea pressione anguli, 1-seriata, tegumentum crassiss. osseum. Interna tenuis celluloso-membranacea. Albumen 0. Embryo oleosus radicula hilum versus infera, cotyledones plicatæ, conduplicatæ accumbentes.

Membrana externa ut videtur decidua folded several times towards the axis.

Secus latus axillis hilo longo angusto notat. micropyle forme apiculi infern.

Cotyledons are obovate oblong cordate in outline, and are folded transversely.

1. The flower seen from above, *a* two apiculate bractes; these afterwards graduate into petals, the innermost of which alone are entirely petaloid, very unequal and the whole densely concave and imbricated.

2. Side view of the flower, *a* edocarp, *b* testa, *c* epicarp, *d* endocarp, *e* angular upper end of seed, *f* hilum, *g* micropyle, *h* hilum, *l* micropyle, *j* raphe, *k* testa, *l* inner very thin membrance occurs, *m* cotyledon, *n* radicle, *o* micropyle, *p* opposite side of embryo.

Hab. In sylvis Assamiæ superioris, cum Camellia Thea plerumque consociata.

E. Barringtonifolia. Fruticosa foliis (maximis) spathulatis vel lanceolato-obovatis cuspidato-acuminatis serratis reticulatis, floribus nutantibus axillaribus solitariis, sessilibus, calyce imbricato gemmie form. Petal carnosis ovario conico

glabro, style basiusqudistinctis fructu calyce stipato rotundato oblongo.

Gemmis laxe imbricatis inconspicue.

Novum genus constat *Eusynaxis* ob conjunctionem Camelliarum cum Gordoneis.

Est etiam planta flore Camelliæ. Pistillo et fructu Malæcodendron gaudens.

Calyx imbricatus interiora in petala abeuntia. Pet. inæqualia, intima minima.

Stam. 00, basi coalita.

Ovarium 5-loculare, stylis 5 vel distinctis vel parte coalitis, stigmata totidem emarginata, ovula uniseriata.

Fructus 5-locularis. Semina angulata, aptera ossea.

This Genus has been casually mentioned in my Tea reports, as an undescribed genus of Upper Assam, which has the imbricate peranthium and stamina of Camellia, and to a considerable extent the pistillum and fruit of Malachodendron, so far as I can judge from the description I have of that plant. This, as it seems to afford a direct passage between the subdivision Gordonieæ and the family Camellieæ as they stand in De Candolle's Prodromus, I have called Eusynaxis.

Gordonia.

1. *Gordoniæ* sp. Pl. DC.

Arbuscula.

Verruculæ ramorum cinereorum pallidæ. Flores odorati majusculi. Stamina petalaque post anthesin plus minus fuscescentia.

Hab. Burmah at Bamo in sylvis: *April* 28*th*, 1837.

2. *Gordoniæ* sp.

Arbor 30, 40 pedalis, ramulis compressis, foliis alternis, lanceolatis longissime acuminatis fere caudatis repandis dentatis penninerviis, marginibus cartilagineis subtus subglaucis,

floribus axillaribus solitariis conspicuis magnis albis odoratis, pedicellis petiolis 2-3 plo longioribus subclavatis, paulo sub-florem bibracteolatis, bracteolis oppositis caducis. Gemmis terminalibus foliolis lanceolatis oblongisve sericeis pilosis tectis.

Cal. 5-sepalus, sepalis rotundatis æstivatione imbricatis.

Cor. gamopetala notata, ad basin fere 5-partit. laciniis ovatis subæqualibus.

Stam. 00 basibus inter se et cum basin corollæ coalita, filam. filiformia, lutescentia. Anth. bilocul. basibus affixæ longit. lateraliterque dehiscent. Connectivum carnosum majusculis, stylus clavatus stamina, subæquans, stigma complanato-peltatum sub 5-lobum, 5-loculare, loculis 3-ovulatis; an semper 3, ovulis pendulis, foramen ad apicem, hilum prope? membranæ ovuli testa secundisque distinctæ axis ovarii crassa 5 angularis. Pl. DLXXXV. A. Fig. VI.

Hab. In sylvis collinis et humiliorib. Mergue : *Nov.* 1834. Altera species, Moulmein vulgata.

3. *Gordonia floribunda.*

Arbor excelsa, 60 pedalis, formosa, cortice cinerea. Rami teretes, ramuli breviter pubescentes. Folia alterna, breviter petiolata, oblongo-lanceolata, acuminata, repanda integra, vel dentata, glabra, subtus glauca, stipulæ lanceolatæ sericeæ, cito deciduæ. Flores solitarii axillares speciosi, albi, odorati. Pedicelli florum inferior longiores, ideoque inflorescentia corymbiformis.

Cal. infer. 5-partitus, sepalis rotundatis, ciliatis.

Cor. gamopetal. rotata, ad basin fere 5-partita. Laciniis rotundato-obovatis.

Stam. 00, ima basin monadelpha et corollæ adnata. Filam subulat. curvata, lutea. Anth. bilocul. longit. dehiscent. Pollen ovatum læve.

Stylus clavatus, sub-angulat. stigma radiatum, e stigmatibus cuneatis 5 formatum, margine retracta.

Ovarium globos. argenteo-sericeum, 5-locul. dissepimentis axique crassis, ovula 2 in quoque loculo, reniformia pendula. Pl. DC. Fig. II. *a* longitudinal, *b* transverse section of the ovary, *c* ovule.

Hab. In sylvis collinis Moulmein copiosa: *Dec. Jan. Feb. March,* 1834.

Dipterosperma.

Dipterospermæ sp.

Arbor magna.

Folia ad apices ramulorum conferta cuneato-spathulata vel cuneato-obovata, distanter serratule ascendentia coriacea carnosa. Gemmarum squamæ paucæ oblongo-lanceolat. forming. oblong conical terminal buds.

Flores solitariis pedicelli bracti, petiole brevis, longitudine cum flora tota externe cano sericeus.

Cal. imbricatus subtus sepalus, coriaceus, but there is little distinction between the sepals and uppermost bracteæ.

Pet. 5 patentia concava rotundata coriaceo-carnos. dorso (partibus internis in æstivat. exceptis) sericeo-pubescent. ope stamina coalita.

Stam. 00, cum petalis secedent. pluriseriata petalis breviora, Anth. oblongæ subversat.

Ovar. super. ovato-conicum. Stylo robusto 5-sulcato apicem stigmat. 5 cuneatis magis radiantib. coronat. 1-loculare! 5 intrant angles wedge-shaped, and 5 alternating in the centre communicate with narrow cells.

Seeds 3 in each cell, large, appense situated near the base, terminating above in a large whitish wing, foramen superior near the base of the wing. The wing is developed from the lower $\frac{1}{2}$ of the raphal face, which is not next the placenta.

Sepals alternate with petals.

Ovules 4 collateral pendulous anatropous produced upwards into a wing. Pl. DCIII. Fig. II.

Terminal scale buds 2 conduplicate vernation of leaf conduplicate-involute.

Obs. Genus indescriptis except its anthers which agree tolerably with those of Godoya.

Certainly distinct from any Ternstrœmiaceous genus known to me, it has the flowers of Camellia and appears to differ from Eusynaxis in the complete union of the styles, and 1-locular ovary and winged ovula.

It is I imagine a congener of Roxb. Camellia axillaris Bot. Reg. 4 t. 349. Capsula in vol. 8 Notes, is described as woody oblong 5-celled, 5-valved, size of a filbert, with many upright top winged seeds in each cell.

Axillary buds pilose.

Erythrochiton.

Gen. Char. Flores dioici, bibracteolati. Cal. inferus profunde 5-partitus. Pet. 5 hypogyna libera, sepalis opposita!! Stam. 00, hypogyna, multiplici serie. Anth. adnatæ, apicibus truncatæ. Ovarium 2-loculare, 4-ovulatum. Styli 2. Stigmata 2, reniformia foliacea. Bacca supera, 2-locularis, 2-4 sperma. Semina pendula arillo? punctulato carnoso inclusa, albuminosa. Embryo curvatus.

Cl. Linneana. Diæcia. Polyandria. Ordo Naturalis. Ternstrœmiaceæ.

Habitus. Arbor mediocris foliis stipulatis perennantibus integris, pedunculis extra axillaribus.

Erythrochiton Wallichianum, Gr. Herb. (Mergue) prop. No. 866, *Dec.* 1834.

In sylvis secus littoram Insulæ Madamacan Mergue proximæ.

Arbor mediocris, dioica; ramulis teretibus. Folia alterna et ad apices ramulorum subverticillatim conferta, oblongo-obovata obtuse et breviter acuminata, integerrima coriacea, parce

1-venosa, supra atro-viridia, infra lutescentia. Petioli basi articulati. Stipulæ? minimæ subulatæ deciduæ. Pedunculi extra axillares, (foliorum abortu?) solitarii 2 unciali flores paulo infra alternatim bibracteolat. Flores majusculi, albida odorato facie Camelliæ.

Calyx profunde 5-partitus, laciniis rotundatis æstivatione imbricatis persistentibus.

Petala 5 hypogyna sepalis opposita ovalia subæqualia patentia carnosa æstivatione imbricata postico reliqua obvolvens, bases versus longitudinaliter rugosa stamina plurima multiplici serie hypogyna, sublibera.

Filamenta brevissima subclavata. Antheræ lineares adnatæ biloculares longitudinaliter dehiscentes directione variæ. Connectivum apice truncatum et dilatatum. Pollen oblongum hinc longitudinaliter sulcatum.

Fæm. Calyx corollaque ut in mare sed multo minus patulæ. Stamina abortiva plurima hypogyna, filiformia plana truncata.

Ovarium Pl. DLXXXV. A. Fig. VII., subglobosum 2-loculare, loculis 2-ovulatis ovula pendula (exapicibus loculorum?) campanulitropa uniformia. Tegumentum duplex foramen hilum prope. Styli 2 brevissima. Stigmata 2 maxima foliacea reniformia, marginibus obtuse inciso-dentatis, anticum et posticum.

Fructus. Bacca exsucca globosa, citri medicæ parvæ magnitudine basi calyce persistenta et subampliato cincta, bilocularis, 2-4 sperma dehiscentia longitudinaliter et irregulariter subquadrivalvis. Semina pendula ab apice placentæ centralis liberæ (funiculis elongatis) arcuata reniformia, arillo? carnoso rugosulo pulcherrima coccineo tecta. Tegumentum duplex.

Exterius subosseum, interius membranaceum. Albumen semini conforme, carnosum, copiosissimum. Embryo in axi albuminis curvatus, hippocrepidiformis, indivisus! secus peripheriam cum albumina coalitus! Radicula teres longissima? hilum versus spectans. Cotyledones carnosæ coalitæ inter se et cum albumine! Plumula inconspicua.

Genus Euryam Cleyeramque intermedium, structura fructus et seminum ad Annesleam accedit, distinctum obformam stigmatum et embryonem indivisum cum albumine coalitum.

I believe that Hopea eglandulosa of Roxburgh, which Mr. Colebrooke in a Mss. note, appended to the description in Roxburgh's Mss. synopsis, long ago stated not to belong to Hopea, (Sarcostigma Roxburghii Wall. Mss.) and which Mr. Brown in his Mss. formerly called Wahtenbergia, not only belongs to this order, but will found to be very nearly allied to this genus; of the genus Sarcostigma, there appears to be a second species from Sylhet.

Cal. Bot. Garden: *July* 15*th*, 1835.

Anneslea.

Anneslæa fragrans, Pl. DLXXXV. A. Fig. XVII.

Arborea, foliis alternis petiolatis lanceolatis coriaceis, integerrime acutis, floribus corymbosis subumbellatisve, albis terminalibus in pedicello articulatis, ad articulum bracteis 2 ovatis.

Cal. Semi-superus profunde 5-partitus, sepalis ovatis, concavis (2 exterior mojorib.) persistentibus coriaceis.

Cor. gamopetala, petalis 5, nempe unguibus latis accretis fauce constricto, limbo connivento 5-partito, laciniis ovatis acutis.

Stam. 00, petalorum unguibus subcohærentia (hypogyna). Filam. brevia complanata. Anth. adnatæ, basi subsagittatæ bilocular longit. dehiscentis. Connectivum ultra antheram in apiculam productum.

Ovarium 2-loculare loculis pauci-ovulatis, ovulis pendulis placenta axilis. Foramen versus hilum.

Hab. In sylvam prope Moulmein, rara: *Jan.* 1834.

Ternstræmiaceæ sp. Pl. DCIV. Fig. I. Itinerary Notes, p. 42, *no.* 667.

Hab. Khasyah Mountains.

Euryæ sp. Pl. DCIV. Fig. III.

Hab. Assam.

HYPERICINEÆ.

Ancistrolobus.

Ancistrolobus sp. Pl. DCV. Fig. II.

Fruticosa longe scandens, ramis junioribus valde elongatis attenuati-foliosis, ramulis? oppositifol. aphyllus, processus uncinatos comutos alternos gerentibus, senioribus ramosis abbrevatis, apices versus foliosis, uncias 1-2 lignosus gerent. trunco commune, e folioso, fol. subsessile obovata juniora emarginata coriacea integra reticulato atroviridia. Inflorescentia terminalia cymosa, cymis divaricatis, dichotomis floribus breviss. pedicellatus, majusculus, corolla coccineo-rubra, pedicellis basin versus 2-bracteatis bracteis minimis.

Cal. 5-sepalus, sepalis oblongo-ovatis, subpatent inæqualibus æstivatione imbricatis.

Cor. 5-petalis, petalis hypogonis sepalis alternis æstivat. imbricatis convolutis, ovulis, basibus carnosis marcescent.

Stam. 10 hypogyna, alternat. breviora, petalis opposit. sæpissime cum petalis per filam basibus dilatat. carnosis subcohærent. subulatis coccineo-rubris. Anth. erectæ, biloculares longit. dehiscentes. Pollen sulcat.

Styli 3 sanguinei, in apice ovar. reticulat. caduca. Stigmata totidem truncata.

Ovar. semi-inferum? 1-loculare, 1-ovulat. ovulo erecto, funiculo brevi sustento, foram. conspicuum ad apicem ovatum, ovule post anthesin apice longe product.

Hab. In sylvis Mergue: *Dec.* 1834, *a* long section of ovary, *b* abortive ovule, *c* secundine. Pet post anthesin convoluto conniventia.

ELODEA.

Frutex elegans, 10 pedal. fol. suboppositis oblongo-ellipticis acuminatis pulchra reticulatis subtus glaucis marginibus magno-punctulatis floribus solitariis supra axillaribus majusculis odoratis. Pedicellis petiolorum longitudine, apices versus articulat. alabastrorum nutantibus demum erectis, parte articulatione supra livida.

Cal. 5-sepal, sepalis late ovatis foliaceo-membranaceis imbricatis 3 exterioribus plus minus livido-tinctis, persistentibus.

Pet 5 hypogyne sepalis alternant. obovata breve unguicula erecta, vel subpatentia pallida coccinea decidua.

Stam. polyadelpha hypogyna Phalanges 3 polyandræ, inæqualis 1-angustior minorque petalo opposit. 2 duplo latiores, quaque petalis 2 opposit. e phalangibus 2 format. complanatæ lineari cuneatæ extrorsu staminifera.

Filam libera subulata. Anth. bilocular erectæ asib. affixæ, longitud. lateraliter dehiscent inferiores cujusque phalangis minores. Pollen albidum oblongum leve, his sulcatum. Connectivum brunneum glandulæ 3 hypogynæ maximæ oblongæ nectariferæ extrorsum cucullatæ cum phalange alternant.

Ovarium super liberum e carpellis 3 format. Styli 3 subpatentes, filiform stigmata 3-capitat. ovar. 3-loculare septis sinuatis loculis 00 ovulatis, ovulis erectis apicibus in membranem cellulosa truncat. expansis, foramen infera hili prop. basi loculor affixis.

HAB. Inter fruticis circa Mergue vulgo *April* 1835. Odor. folior-contusorum subaromat.

Genus distinctum, præcipue obphalanges anisomeras petalisque oppositus. Glandulæ 3-sepalis totidem opposit. 2 abortivis.

HYPERICUM.

Hyperici sp. Pl. DCV. Fig. I.

Habitat. Burma at Khathung Kyawn : *March*, 1837.

PAPYACEÆ.

Carica.

Carica papya, Pl. DLXXXIV. Fig. II.

PASSIFLOREÆ.

Trichodia.

Arbor foliis alternis (habitu Casearieæ) oblongis late crenulatis. Flores axillares glomeratæ ; ferrugineo-viridescentes. Pedicelli basin articulati 3-bracteolati.

Perianth. duplici serie 10 partitum, sepalis 3 exterioribus majoribus, calycinis, squamulæ indefinite simplice serie ex ima basin perianth ortæ lineares villosæ discretæ vel in phalanges coalitæ.

Cal. 5-sepalus, imbricatus corona c squamular. discret. vel coalit. linearium, villosar. simplice serie.

Stam. 5 basi breviter monadelph.

Anth. basi cordatæ profunde, sinu affix. accumbentes. Pollen round, 3-plicate.

Ovaria stipulat. Placentæ bi-ovulat. Styli 3. Stigmata reniform capsula chartacea, 3-valvis, seminib. 2-3 arillatis.

Capsulæ pubescentes erectæ.

Aspectus etiam præsertim capsular Euphorbiaceum.

Habit certainly of Vareca, locus naturalis Passifloreæ.

Obs. There is scarcely any difference between the petals and the inner sepals.

From the characters as given in Don, this plant, it would appear to be an undescribed genus, allied to *Paropsia*, and intermediate between the two divisions, the ovaria being stalked, it is also allied by some of its characters to Modecca, to Smethmannia, in the short corona with a tendency to union, when it would be urceolate.

In the water in which some old anthers had been put, innumerable elliptic bodies occasionally mixed with short moniliform ones were observed, yet to the water itself I do not think these belonged.

Trichodia varecifformis, Gr.

Arbor mediocris.

Ramulo elongate ferrugineo-pubescente.

Fol. altern vernatione involuto-conduplicat. plus minus concavis oblongis, obtuse cuspidatis late crenato-serratis glabris, venis 2-dariis arcuata nexis, interveniis reticulata sublente minute punctulat. subdiaphan. exstipulat. linea decurrens evanida hinc basis petiole.

Flores in axillis, pauce glomerati, pedicellis basi 3 bracteolatis ibidem articulatis pedicellis petiolos breves excedent.

Cal. 5-sepalus, sepalis lanceolato-ovatis extus ferrugineo pubescente inæqualibus 2 interior duplo minor.

Pet. totidem alternant. sepalis intimis subsimilibus pubescent.

Stam. sterilia 5 filiform. sepalis opposita, arising from immediately under the ovarium which is stalked.

Between the stamen and petals is a series of linear very villous bodies.

Ovary subglobos. 3-lobed sulcate pubescent, each lobe terminated by a short subulate pubescent style, stigma 3, long. reniform caducous.

The villous bodies (corona) are either distinct or united into flat lobed phalanges.

The stamina are united at the base into a membranous tube which conceals and adheres to the stalk of the ovary.

Ovar. 1-celled with 3 parietal placentæ, ovula compressed anatropous on short stout funicles, collateral, from the base of placental lines, galeiforme.

Capsula green pubescent rounded 3-lobed terminated by styles, at the base. Perianth and corona unchanged, but browned 1 celled, as it were inflated, endocarp cellular chartaceous.

Seeds 2-3, about $\frac{1}{2}$ way between middle and base of placentæ, compressed $\frac{1}{2}$ covered by arillus which is entire with crenulate margin.

Young testa scrobicular, internally with very many conical verrucæ.

Anth. attached by the middle? bilocular; I am not certain whether the flowers are polygamous, I find on one, the remains of anthers terminating the filament as long as the perianthial leaves.

The calyx leaves are reflexed at the apex, petals are erect.

Passiflora.

Passifloræ sp. Pl. DCV. Fig. IV.

Hab. Khasyah mountains at Churra Ponjee.

MORINGACEÆ.

Hyperanthera.

Hyperanthera moringa, Pl. DCIX. Figs. I. II.

Cal. tubo cyathiforme profunde 5-partit. laciniis, lanceolato-linearibus, parti libera petaloideis patenti-reflexis plus-minus concavis. 5to postico.

Cor. 5-petala patalis sepalis sub conformibus spathulat. 2 superior minoribus lateralibusque intermediis ascendentibus 5to majore porrecto antico sepalis alternantia, 1 2 superior bases versus pubescentibus.

Stam. declinat. 10 alterna sterilia sepalis, alterna fertilia majoraque petalis opposit filam subulatis basibus villosis.

Ovarium teres stipitatum villosum. Stylus brevis subclavatus. Stigma truncat. sub excavat. Ovar. 3-sulcatim 1-loculare, pluri-ovulat. ovulis simplice serie placentis 3-linearibus parietalibus affix. foramen hilum prope.

Arbuscula, foliis supra decompositis. Paniculis axillaribus floribus albis. Pollen læve, hinc sulcatum, affinitus cum Xanthoph. eglanduloso p. 537.

Obs. I have no notes by me on the structure of Xanthophyllum; but if I conjecture rightly the development of the sta-

mina is a good deal analogous to that of Moringa, in which if 10 were developed the uppermost would as in Leguminosæ be the smallest. The opposition of the two lowermost to the carina may be explained by assuming the obliteration of the proper 1st stamen, and the approximation from pressure of the two normally alternating with the carina, so that they become opposed to it, of this opposition by pressure other instances occur.

Of course this view is only reasoning on the idea, that the petals are properly developed, if not so, then the opposition of these is at once accounted for.

X. flavescens approaches Moringa in its pluriovular ovarium.

No stipulæ exist, unless they are represented by glands.

The great differences it has with Leguminosæ exists in the unilocular anthers, the position of the 5th petal which is anticous, the compound nature of the pistillum, and the nature of the ovula, which in Leguminosæ are campulitrope, and in this anatropa, that is the base of the nucleus corresponds to the apparent apex of the ovulum.

The great objection to the idea of DC. that Moringa is a constantly tricarpellar Leguminousa, I take to be that, if this really were the case, each carpellum would be distinct, since in all cases in which an additional carpella is formed in Leguminosæ, it is always so, hence a tricarpellar Leguminosa if it ever be found, will be apocarpo-tricarpellar, not as in this genus, syncarpo tricarpellar.

With Samydaceæ it has, but little in common, although externally there are no signs indicating ternary composition of the style, yet the shape of its cavity as well as the distribution of its vessels into three fascicles, point this out. The stigma is cup-shaped, or rather none exists. the communication with the interior of the ovary, is free and distinct, and the pollen comes in immediate contact with the mucous conducting tissue by which it is filled; such a structure is compatible with placentary stigma, but incom-

patible with a stigma consisting of the denuded apex of the midrib, see also Viola, etc.

Hairs simple, those of base of stamina irregular.

1. Alabast posticous.
2. Do. anticous.
3. Flower just expanding posticous.
4. Do. anticous.
5. Flower viewed laterally.
6. Do. sepals removed.
7. Genetalia mascula in situ, pistillum hidden by these.
8. Do. long section.
9. Stamen anther lateral.
10. Do. front or external.
11. Do. internal or back.
12. Dehisced anther, shewing the adhesive subwaxy pollen.
13. Young anther transverse section.
14. Two globules of pollen viewed in water with a portion of their oily secretion.
15. Apex of style and stigma.
15*a*. Do. transverse section.
16. Ovary transverse section.
17. Portion of placenta and ovula in situ.
18. Ovule ad anthesin.
19. Young ovule long section.
20. Ovule after fecundation.
21. Do. long section, *a* testa, *b* inner tegument distinct only towards its neck, *c* nucleus, now nearly completely excavated, *d* chalaza, *e* carunculus formed by an induration of the foramen.
22. Partium situs et alternantio.

The real affinity of this genus is certainly with Polygaleæ through Xanthophyllum, to this Lindley has made an approximation, he refers it to Parietales, but next to Violaceæ. With Xanthophyllum, it has striking resemblances, witness the papillionaceous corolla, unilocular stamina, their direction, etc. and lastly glandulation. It differs from it in the

perigynous corolla and stamina, tricarpellary formation of the ovary, aud in the polyspermous fruit.

This genus has a greater degree of affinity to Leguminosæ than Polygaleæ in general have, it will form a decided transition between the two orders, chiefly owing to the perigynous insertion of its corolla and stamina.

To the latter Order an additional affinity is pointed out by the obvious tendency of the calyx to assume a petaloid form.

The deciduousness of the petaloid portion of the calyx occurs in Roydsia to an equal degree. The stalk of the ovary subsequently assumes the appearance of the remaining portion of ovary, but it is solid. The embryonary sac is of late appearance, I find no trace of it even when the young fruit is nearly a span long.

The glandulation of the leaves is similar to that of some species of Cassia, I allude to the stipitate ones found between the folioles, in this genus their presence is not constant.

Bamo: *April 29th*, 1836.

VIOLACEÆ.

Viola.

Violæ sp. Pl. DCVII. Fig. II.

Subacaulis estolonifera, fol. longe petiolata hastato-cordata, obtusa crenato-dentato, vernatione convolute subtus sæpe purpurascentia, in petiola attenuata. Pedunculi medium versus 2-bracteolat. plano-convexi apice nutantes. Bracteæ subulatæ ad pressæ. Flores majusculi cæruleo-purpurei inodori, calcare obtusissimo fuscescente rubro-punctulato.

Sepala lanceolata declinato basin auriculata præsertim 2 antica.

Pet. venosa oblonga, 2 postica ascendentia, antico porrecto, hoc et lateralia 2, qua subascendentia et intus mar-

gines superos versus barbata sunt, basibus albidis, venis atro-purpureis lineata.

Antheræ albidæ, apicibus membranaceis circa stylum conum efformantibus aureis, subulis 2 qui a connectivis staminum 2-infimorum originem ducunt et in calcar currunt, viridescentibus. Ovarium antheris circumcinctum, conicum sub 3-gonum, stylus cono apicum inclusus clavatus, apice trigono truncato, stigma foveolum transversum profundum in capite styli orificium ad styli angulum inferum anticumve.

Ovarium 3-gonum angulo tertio postico, ovula 00 rotundato, tegumenta 2 distincto foramen hilum prope, cuique placentæ series 3-4 ovulorum ad sunt.

Capsula calyce immulato persistante suffult. stylo stigmataque sphacelato-apiculata, 1-locularis, loculicida 3-valvis, valvis patentissimis navicularibus hinc utrinque lineatis. Semina lævia pallidissime brunnea, rotundato-obovata, micropyle mammillæformis hilum prope, arillata, arillo albo.

Secus situm pendula transversa vel ascendentia, 4-seriata.

Tegument. unicum extus cellulos. intus fibrosum chartaceum fragile, vestit. membrana tenuissime, albumen copiosum carnosum.

Embryo axillis orthotropus, viridescens simplissima.

Radicula teres, obtusiuscula longitudine cotyledonum. Cotyl. planæ foliaceæ raphe opposita. Plumula inconspicua.

Obs. It is difficult to conceive how impregnation takes place, as there is evidently no access for the pollen to the stigma. That this however does take place, I have no doubt from the appearance of the stigma, after the capsule has commenced to enlarge, and after the embryo has become visible, yet in one instance I could not find any remains of tubes or pollen in the stigma or style, there is a membrane however that lines the cavity of the style.

Hab. In campis, Suddyah prope communis Burrumpootur: *Jan. 4th*, 1836.

CAPARIDACEÆ.

Capparis.

Capparis oligandra.

Frutex scandens inermis, fol. oblongis basi cordatis subacuminatis emarginatis.

Racemis subumbellatis densifloris axillaribus, sepalis 4 ovatis reflexis.

Pet totidem oblongum albida.

Stam. 8 filam capillarib. longis. Anth. oblongis biloculatib.

Ovar. stipitat. stipite unciali. Stylus brevissimus stigma obtusum simplex, 1-loculare placentis parietalibus, ovula 00 foramen conspicuum hilum prope.

Hab. Mergue. Sp. distincto ob stamina definite.

Capparis versicolor.

Fruticosa scandens ramis teretibus viridibus, fol. breve petiolatis lanceolatis acuminatis emarginatisque glaberrimis integerrimis lucidis. Petiolis brevibus supra ferrugineo pubescent, spinus geminus subulatis acutissimis patente recurvis, floribus solitariis axillaribus pedicellis foliis duplo fere breviorib. alabast. globos. floribus, maximis ephemeris, primo albis cito rosaceis exceptis odoratissimis, odor nuces moschatæ.

Sepala 4 patentia 2 interiora subpetaloidea.

Pet totidem subobovata emarginata repanda intus materia flocculosa vestita.

Stam. 00 numerosiss. longissim. filam. subulata. Anth. basibus affixæ, bilocular longit. dehiscentes, connectiv. ampliat. Pollen lanceolat. sulcat. læve.

Ovar. longissime stipitat. stipite albo. Stylus conicus brevis stigma simplex. Ovar. 1-loculare placentis 4-parietalibus, ovula 00 funiculis longiusculis sustent. campulitropa foramen hilum prope. Villi petalor. articulat.

Hab. Mergue. In sylvis : *January*, 1835.

Roydsia.

1. *Roydsia parviflora*, Gr. Pl. DCVII. Fig. 1.

Cortex cinereus maculis parvis albis.

Foliorum intervenia majora subtus concava, supra luteo-viridia subtus pallida, venatione saturatius colorata.

Racemi viridescentes uti bracteæ.

Sepala fusco-viridescentia intus stamina aurea. Antheræ plumbea.

Ovarium rubescens.

Planta scandens fruticosa.

Hab. In sylvis collinis versus Serpentine mines, Hookum valley between Assam and Burmah, *April* 3*rd*, 1837.

Referred to Caparideæ in Lindl. Nat. Orders, 2nd edit. With this order it agrees in habit and gynophore, but in the want of petals and especially in the structure of the seed, it is widely different. It is the type of a distinct order.

2. *Roydsia suaveolens*, Pl. DCVI.

Fructus racemosi, pedicelli basi articulati, stipiti proprio fructus paullo breviores, utrinque dilatati, stipites basin versus obsolete annulati, annulo situs staminum ostendente, exacte ovales, interdum rotundata magnitudine Grossulariæ magnæ, virides, verrucis furfuraceis copiose tectis, apice foveolatis, demum baccatis 1-loculares. Epicarp. viride. Mesocarp. crassum albido-ochroleucum. Endocarp. lævis tenuis fibrosa, densa.

Semen unicum maximum exalbuminosum erectum.

Tegument solitarium, luteum crassius. carnosum tunc margine sphacelato sensim tenuissimum factum, spongioso-cellulos. Endocarpio arcte adnatum, potius tegument exterius endocarpio adnat. tenue, ruptum, spongioso-cellulosum, cotyledon plicaturum opposit. vasculoso-reticulat.

Interius semi-completum luteum crassius carnosum, margine irregulari-subsphacelato, cotyledon plicatura opposit. cæterum subito tenuissimum embryoni adhærens.

Embryo orthotropus, viridis. Cotyledones carnosæ quam maxime inæquales, conduplicatæ, interior multo minor plana exterior-plano convexa.

Radicula breviuscula infera inter commissura cotyledones exterioris semi-recondita, obtusa. Plumula inconspicua.

Fasc. vas. testæ.ternæ, medio subsimplice, lateralibus exterior. ramosis, rami semi ambientes.

Ovula plura minuta abortientia descernantur dorso testæ.

Cotyledon interna aliquando, cotyledon externa soliţo productiorę omnino inclusa, sæpius margines ejus externæ sunt.

Genus pluribus notis ab omnibus aliis mihi cognit.

Suddyah : *August 22nd*, 1836.

3. *Capparis* sp. Pl. DCVIII.

Frutex scandens elegans floribus filamentis primo albis demum purpureo tinctis odoratis.

Hab. Burma at Bamo: *April 26th*, 1837.

CRUCIFERÆ.

General Remarks.

In Cruciferæ, we have first the total abortion of all the bracteæ, which as Link says, indicates a high irregularity of structure. The sepals and petals present no anomalies, differing only from the usual form in the quaternary number of the sepals, one is anticous, the other posticous, consequently both the petals are lateral; we then have 6 stamens of which the two outermost belong evidently to an outer series and these are opposite the two lateral sepals. The remaining 4, which are the longest, may be considered as opposite the petals, although such is scarcely the exact case.

We then have 4 glands, which I look upon as belonging to one series, placed opposite to each sepal, the two lateral ones being placed within the corresponding filaments. It is my opinion from the above facts, that the two stamina opposite the anticous and posticous sepals are totally deficient, the 2

glands having nothing whatever to do with them. In such a case we have a deficient outer series of stamina: a complete intermediate one, and an abortive inner one represented by glands; all these parts having the regular alternation. The greatest anomaly is presented by the pistillum, the ovary being bilocular, the cells right and left, the placentæ being parietal and anticous, and posticous, mutually connected with the interposition of a cellular plate. But the stigmata are opposite the placenta, or anticous and posticous. I think however that there are indications of the quaternary composition of the style and stigmata, which last are opposite the sepals as they should be. If this be found to be true, then Mr. Lindley's opinion that the carpella are 4, 2 barren, 2 placentiferous anticous and posticous, and the formation will be complete.

Tauscheria.

Tauscheriæ sp. Pl. DCX. Itinerary Notes, p. 247, *no.* 390.

Planta valde varians, statura uncialis vel pedalis.

Caulis flexuosus, foliis inferioribus pinnatis pinnulis alternis pinnatifidis secus latus inferius subintegris.

Intermedius basi auriculatis, auricula apice lobata cæterum inferioribus similibus, superior ad auricula reductis ovatis concavis, basi maxima hastato-cordatis obapproximationem auriculare quasi perfoliatis, glaucis.

Æstivat. imbricat. sepalis exterior majoribus.

Racemis nudis terminalibus, pedicellis gracilibus floribus minutis luteis. Calyx basi planus sepalis oblongis exterior majoribus.

Petala 2-3 uno duove sæpius an semper abortiente, spathulata erecta emarginata lutea, longe unguiculata, basi glandula adhærente stipata.

Stam. glandulis nullis interjectis sed basi subincrassat. Anth. basin affixæ biloculares, non adnata.

Ovarium complanatum, oblongo-obcordatum biloculare ovulis solitariis pendulis ex apice loculi stylus brevis stigma capitatum.

Semina (immatura) marginata testa superfice cellulosa solubilis immersionem. Embryo curvatus radicula in dorso cotyledonis replicata.

Obs. A plant very like this is figured in Royles illust. under name of Tauscheria desertorum.

The nature of the simple quasi perfoliate leaves is obvious and is analogous to what takes place in some Umbelliferæ, and in a less degree to certain cases among Mimoseæ.

The alternation of the parts is obscure, and the presence of the gland attached to the base of the petals, does not allow us to consider the longer stamina as belonging to the petals but that it is displaced. There is no proof of composition of the outer and larger sepals, or it would be of easy explanation.

There is little doubt, but that several types of structure prevail in the order independent of that of the seed; the value of which has not been yet tested. It is curious, that when three petals alone are formed no extra stamen is developed.

1. Plant.
2. Alabast. lateral view, *2a* front view of do.
3. Flower, lateral and front views.
4. Flower, one outer sepal removed, shewing the opposition to it of a longer pair of stamens.

4a. Same, all sepals removed.

5. Petal with its basilar gland.
6. Stamina back and front.

8, 8. Ovulum and long section.

9. Youngish fruit.
10. Do. long section.
11. Transverse of young seed.
12. Section of young seed shewing that the direction of the cotyledons takes place very early.
13. Situation and alternation of parts, *a* short stamin, *b* sepals, *c* petals and gland, *d* longer stamina.

Draba.

Drabæ sp. Pl. DCXI. Itinerary Notes, p. 243, *no.* 364.

1. Plant largest sized specimen.
2. Bud.
3. Flower open.
4. Do. parts of envelopes spread out to shew the relative situation of the stamina, etc.
5. Same calyx removed.
6. Same petals in situ.
7. Back view of anther.
8. Front do. after dehiscence.
9. Section of pistillum through placentæ.
10. Transverse do.
11. Ovulum.
12. Fruit.
13. Do. dehisced.
14. Seed.
15. Do. long section.
16. Embryo laterally.
17. Radical face of do.
18. Partium situs. *a* short stam., *d* long ditto, *b* sepals.

Obs. This species, unless my memory misleads me, is very much like Draba verna.

It has all the points of genuine Cruciferæ, the glands are irregular generally more or less wanting.

There can be no doubt, I think but that Cruciferæ are 8 or even 12-androns. Of the stamens, the outer series is complete, although unequal, the second series is represented by glands, and the third is half complete and represented by two of the longer stamina, which are opposed to the lateral sepals, and although in most cases it is not exactly defined, which of the two are outer or inner, yet cases abundantly occur which suggest that this may arise from pressure, or two of the longer, may belong to two petals, the displace-

ment depending upon causes, which are obvious in some other plants.

In the pistillum there is nothing singular; the opposition of the placentæ to the stigmata can be as satisfactorily accounted for, as the loculicidal dehiscence of certain fruit. The production of the septum is curious, in as much as it points out the extreme tendency in all the most perfect families, to have bilocular fruit.

The natural divisions of Cruciferæ will probably be pointed out by the sensible properties, as much as by any thing else.

BEGONIACEÆ.

Begonia.

Begoniæ sp. Pl. DCXII.

Pedicel. peduncul. sepala hispida, ramentis reflexis vel patentissimis sanguineis, folia viridia.

HOMALIACEÆ.

Homalinea.

Novum genus, Pl. DCXIII. Fig. I.

Perianth. duplici serie 4-partitum, laciniis fimbriatis externis minoribus, glandulæ 4, sepalis externis oppositis. Stam. 4 (internis opposit.) Styli 4. Ovar. nondum extum.

Arbor magna primo intuiti Henslovia pubescens referens, fol. alterna stipulata, et partes novellæ pubescentia, stipulæ, deciduæ. Paniculæ compositæ racemiformes, axillares pendulæ, æstiv. imbricat. Flores minuti viridescenti. ingrati odori, pedicellis medio-incrassatis et articulatis.

Homalineæ, Pl. DCXIII. Fig. II.

Pedicelli clavati, infra fructum in annulum dilatati.

Fructus inferus, calyce omnino adnat. subturbinatus carnoso-coriaceus, lævis.

Calyce limbo 5-dentato calyce sinubus amplis discoque magno carnoso hinc sepalis opposito cicatricibus petalorum majusculus 5 notat. hinc cicatricibus totidem (staminum) minoribus, sepalis alternantibus notat. medioque styli cicatrici circulari, 1-locularis.

Placentæ numero irregulares, potius axiles, liberæ, septis incompletis albis tenuissimis affixæ, septis ad basin fructus axin attingentibus an semper, semina 00, plurima abortientia, subascendentia minuta.

Testa cellulosa crassiuscula, aquæ immersa superficia gelatinosa materia gelatinosa fibris irregularibus precursa, an semper et an originantes e dislocatione parietum cellularum? Raphe chalazaque 0! Tegument internum membranaceum brunneum vix urceolatum, areolis si conspicuis e pressione cellulorum testæ ortis, igiturque e sacculo embroyonifero ortum.

Albumen farinaceum? densum album.

Embryo axilis orthotropus viridis. Radicula infera longissima cotyl. duplo superans, cotyledones ovatæ plano-convexiusculæ approximatæ. Plumula inconspicua.

Planta singularis iterum examinand. e collibus Abor dictis An Homalineis affinis, vix ovar. certe 4, 5 locular.

Upper Assam. Suddyah: *July 15th*, 1836.

Blackwellia.

***Blackwelliæ* sp.**

Arbuscula, inelegans, ramulis flexuosis petiolis foliisque subtus pubescente hispidis, fol. alterna bistipulata breviter petiolatis oblongo-ovatis basi cordatis breviter obtusque acuminatis grosse crenato-serratis. Paniculis axillaribus folia excedentibus velutinis, racemosis, racemis abbreviatis, pauciflоris, pedicellis basi articulatis bracteolatis flоribus inconspicuis lutescente albidis, stipulis ovatis membranaceis decidious.

Cal. tubo turbinat. ovario adnato limbo 8, 9 partito, laciniis lineari-subulatis, primo reflexis cito patentibus.

Pet totidem iis alternantia sinubus calycinis inserta spathulato-obovata, pubescent longis ciliata.

Glandulæ 10 perygināe lutescentes ramosæ rotundatæ sessiles ad bases sepalorum.

Stam. petalorum numero dupla perigyna intus glandular biseriata insert. seriei externe longiora, petalo cuique opposita! patentia primo erecta in super stigmata.

Ovar. pilosissime, styli 5 filiform distincte, stigmato totidem simplica.

Filam. subulata. Anth. reniformes didymæ sinu affix. loculis longitud. dehiscent. connectivum ampliatum carnosum. Pollen oblonga læve hinc sulcata.

Ovar. calyce adnat. 1-loculare pluri-ovulat. intus præcipue placentus secus longe villosum, ovulis 00 pendulis, foram. superum hilum versus, placentis parietalib. tot quot stylis affixa.

The placentæ are confined to the roof of the ovarium, the ovula, especially the lower are longly funiculate. Pl. DLXXXV. A. Fig. X. Stam. and ovule.

Obs. Genus distinct. Ordinis Homalinear. aspectu Tiliaceum, cum ordini certe affine, æstivat. calycis valvat. Petalor. induplicato-valvatum quodque par proprium staminum amplectent, more Rhizophearum quarumdam. An nove species.

Hab. Mergue 1834.

CUCURBITACEÆ.

General Remarks.

A unilocular fruit is the type of Cucurbitaceæ, as the ovarium is in some which have a trilocular fruit, unilocular. The attachment of the ovula is parietal in these, and the apparently anomalous result arises from the growth of the placenta inwards towards the axis where they subsequently meet, and outwards among the ovula, and more or less between themselves, although traces of their original distinct separation continue for some time visible. Pl. DCXVI. Fig. VII. *a. c.*

This being the case an unilocular ovarium ought not to ex-

cite our surprise, although the pendulousness of the ovula from the apex of the ovarium, should. This therefore must be introduced into the character of Actinostemma. The lateral lobes of the placentæ are alone ovuliferous, the ovula are fixed to their outer surface as regards the carpellary leaf, to the inner as regards the placenta: they are immersed. This is their normal situation, so that judging from the early state of the ovaria, there is nothing anomalous in their situation. The articulation of the pedicels is not a constant character.

The completion of the raphe appears a general character, and this as in some others certainly does not appear to run in the testa or outer integument.

In one instance an exceedingly fine membrane is interposed between the nucleus and inner integument; of the origin of this I am ignorant, not having had an opportunity of examining the ovula until sometime after fecundation. In this too, the tissue immediately surrounding each ovule, is separable with the ovulum, and might be mistaken for an additional integument.

This arilliform integument completely envelopes the seeds, it is perforate alone at its base for the passage of the vessels of the funicle.

In Coccinia there is no distinction of coats, nothing to indicate any distinction of parts in the structure of the tube of calyx, all the vessels too are on the same plane; at a very early age the cavity of the ovary will be found occupied by three wedge-shaped placenta, which even now have somewhat the appearance of inverted carpellary leaves. These placenta correspond to as many stigmata, which are quite distinct from each other, and also have an appearance as if slighty folded outwards.

Yet there are grave objections to the adoption of this opinion, in the first place, it implies a simplicity of placenta in a compound ovarium, and it requires that the spaces interposed between the placentæ, constituting the cavities of the

fruit, be considered as spaces between the carpellary leaves, dependent on the inflexion of these, and it also requires that the canals of communication between the stigmatic lines of each leaf and its placentæ shall not run down between the margins of each leaf, but between the margins of contiguous leaves.

The only thing in its favour is the appearance and distinctness of the stigmata, but intimate union between contiguous stigmatic lines may exist at a very early period, we must admit also that the styles are bilobed, but this is not an uncommon structure.

There is nothing perhaps more fixed in Botany than the relation of the two surfaces of the leaf with the stem, all the inversions are satisfactorily explainable. It is difficult I think, to conceive how any inversion of an adherent carpellary leaf can occur.

The whole of our ideas of adherent calyces perhaps require modification. In Cactus the cavity of the ovarium is a cavity in the flowering branch, the structure of which is otherwise precisely the same as that of the ordinary branches.

Or the calyx must be considered as highly imbricated, each sepal producing the same bodies in its axillæ as the leaves do, but here also there is nothing whatever to point out, that there is such adhesion, the structure is perfectly homogeneous; on this point too much attention cannot be paid to Escholtzia, in which although the sepals are originally hypogynus, they subsequently become lifted up into perigynism by a growth of the torus round the lower part of the ovary. The margin of this is also produced into a calycine rim.

Coccinia is chiefly remarkable for the spurious subdivision of the fruit. The original placentæ are however recognisable at an advanced period, by attending to the direction of the seeds.

Few structures could be more disguised than this, the spaces between the placenta being completely filled up by

dense white tissue and the placentæ themselves being divided into as many partitions as there are seeds.

The ripe fruit is red except at the base, the septa of the placentæ have now a veiny appearance, they separate with the seed, which nevertheless have the peculiar membranous spurious arillus, filled with juice in immediate contact with the seed. The seeds have the usual appearance.

The original cellular placentæ are still traceable, but now consists of a mass of veins, ramified on the septa surrounding each seed.

Such plants as Triceras, Actinostemma and Zanonia will throw light on the true nature of the fruit.

In the Kunkree Cucurbita, the obscuring circumstances take place very early, for even when the bud of the female flower is only $3\frac{1}{2}$ lines long; the Placentæ fill the cavity of the fruit, and have assumed their triangular shape Pl. DCXVII. Fig. 1. *a* true stigma, *b* separable compound lobe, *c* limits of the stigma.

At this period, the resemblance they bear to an inverted leaf is very striking, and the axis of the inner angle is occupied by a developing vascular axis.

The stigmata at this period have acquired the form they are to bear, as well as the cohesion, they separate into 3 lobes, (each of which is *bilobed* along the outer face).

The separable lobes correspond with the placentæ, that is, a line carried up along the inner angle of these will correspond with their axes, impinging on the sinus of their lobes. The perfect stigmata are remarkable enough, a transverse section of each lobe shews that it represents a leaf rolled outward, with its margins curved, and placed in opposition. (See the lower figure.)

The stigmatic surface occupies the whole innerface of the lobe (as respects the axis) and also the whole of the apparent outer surface itself, extending to the margins.

The space formed by the incurvation is not occupied by stigmatic surface, and what is remarkable, presents hairs

similar to those found on the back of the style sparingly and in immense numbers on the tube of the calyx.

These spaces, do not communicate with the placentæ.

The stigmatic canal has the usual structure: it is lined with stigmatic tissue and presents 3 faces, and 3 round angles, which angles correspond with the fissures between the separable lobes.

The styles are very vascular possessing many fascicles, the dilated part presents two converging and diverging from the upper part of the style.

I believe in fact, that the separable lobes of the stigma are in reality compound, that each style is bifid and each division expanded into a lamina curved outwards, and then inwards. These divisions mutually cohere, simulating a lobe of a true stigma.

For the lines of communication with the stigmatic canal alternate with these lobes, the lobes themselves have no central vascular axis which they would have, did they correspond with the midrib of the leaf.

It is curious that if such explanation be correct, the nature of the inflexion of the style, in its expanded part will correspond in a considerable measure with that of the carpellary leaf, as seen in the very young states of Coccinia indica.

It follows that if this be the case Dr. Wights hypothesis cannot be correct, for that necessarily requires that the midrib shall correspond with the axis of the placentæ.

It is not a little remarkable that the apparent inversion of the carpellary leaf should be so continued in the dilated part of the style.

My ideas of the stigmata of this plant (the kunkree) are represented in the annexed diagram, Pl. DCXVII. Fig. II. *a*, *a*, *a* midrib, *b* ditto, *c* direction of the line of convolution, *d* style with vessels, *e* stigma.

In Gardenia there is an evident tendency to dilatation of the styles, which are in their upper part battledore-shaped, they are slightly bilobed, the stigmatic tissue occupies the

whole inner face, running down in a gradually widening line from the place where the convolution becomes less.

This plant is worth noticing from the apparent total incorporation of the filaments with the tube of the corrola, as well as from the change in color of this, from green to yellow at the point of attachment of the anthers. Then the whole inner surface of tube is roughish.

[In Alpina allughas Pl. DCXVII. Fig. —— (partis situs, and transverse section of the ovarium, on the right of Fig. V.) there are some appearances as if the labellum was made up of the three stamina that ought to be opposed to the outer perianth.

The two abortive stamina alternate with the anticous of the outer perianth, or in other words, are opposed to the two lower ones of the inner perianth.

If this is correct the lateral inner stamina will be represented by the rounded lateral lobes of the labellum, the anticous one will be marked out by the two dark red lines, and it will be bipartite as in the posticous perfect one.

There is as much reason for supposing the carpellary leaves to be reversed as there is in Cucurbitacea.

Supplementary cells exist in Funkia, the habit of which is entirely Amaryllideous Pl. DCXVII. Fig. V.

Of the nature of these slit-shaped cells I am not certain, but from the disposition of the central tissue as regards the ovuliferous cells, I am almost disposed to treat them as supplementary.

I must however observe that no trace of them exists in the style, which appears to entirely belong to the fertile ones.

It is also obvious that they may be nothing more than the spaces between the carpellary leaves not filled up, although it would be more likely from analogy to find out such interstitial spaces towards the circumference, than towards the centre.

It is singular that by transmitted light it looks just like the tissue lining the cell, there is a tendency in the slits to pass outwards above near the base of the style, and to become more distant from the outside the further they proceed. They gradually disappear below. At the base, the venation is well shown by the curve of the placentary vessels.

In this, when an outer additional lacinia is developed so also is an additional locule of the ovary.]

Luffa.

Luffa acutangula.

Scandens scabra, caulis angulatus, fol. ambitu reniformia cordata sub 7-loba, mucronato-dentata basi 5-venia.

Cirrhi ramosi hinc petiolis sub adjecta.

Bractea magna carnosa a qua maxima glandulis calliformibus prædita, postica vel supera cuique inflorescentiæ adest.

Inflorescentia videtur vere terminalis. Flores masculi, racemosi supera quoad fæminea, racemo spithamæa vel dodrantale.

Pedicelli infra medium articulati bracteoque carnosa glandulosa, plus minus pedicella (infra articul.) connata suffulta.

Calyx tubus conicus, lacinjis ovato-lanceolatis 3-veniis æstivatione valvatis.

Cor. rotata laciniis profundis obovato-cuneatis 5-venosis.

Æstivatione imbricata marginibus valde inflexis, basi albopilosa.

Stam. 5. Filament. unico singulo sepalo opposita, dua petalis opposita profunde bipartita.

Connectivum omni dilatatissime lobatum.

Antheræ maximæ uniloculares præ aliis sinuatæ, loculis angustissimis.

Torus glandulosus cyathiformis calycis fundum occupans. Rudim. fæm. centrale conicum.

Pollen sphærica læve maximum sub Onagraroideum triporosum.

Flos. fæmineus solitarius inter racemum et cirrhum. Pedicello inarticulato biunciali.

Calycis tubus adnatus omnino longissima cylindricus, laciniis lanceolatis glandulis elevatis sparsis, æstivatione valvatis.

Cor. rotata 5-petala, cæterum ut in mare. Stam. rudimenta 5 filamentis toro inserta ut in masculo sed minoribus antheris orbatis.

Stylus cylindricus glaber. Stigmata tria maxima velutino-papillosa sublunulata.

Ovarium solidum, placentis 3 nempe centro coalitis, partibus ovuliferis tantum non-cohærentibus ovula immersa transversa.

Styli vasc. fasc. 9 nempe uni 3, uno centrali rotundato, 2 laterali oblongis transverse.

Mas. Cor. rotata. Stam. 5-tria adelpha, adelphis duobus bipartitis. Antheræ sinuatæ.

Fæm. Cal. tubus cylindricus. Cor. 5 petala, stam. abortiv. 5.

Stigmata 3-lunulato reniformia.

Obs. There is some reason for supposing the Cirrhi of this to be modified petioles in spite of their laterality, because their divisions correspond in number to the veins of the leaves! This however does not apply to some, as the following Trichosanthes, in which the leaves are 3-veined, the Cirrhi 2, or 3-partite. Look whether any Cucurbits with one vein have divided Cirrhi.

Luffa fœtida, Pl. DCXVI. Fig. I. Development of the Pollen.

1. Alabast, 1½ line long, cells of anther filled with a subcoherent mass yet separable by pressure, outline of cells distinct, all entirely filled with grumous matter, earlier than this, the mass is not separable, nor are the cell distinct.
2. Mass easily separable from the anther, still cohering

as to its component parts, cells distinct partially occupied by the grumous matter.

3. 2½ lines long, cells slightly cohærent, nucleus ternarily divided.
4. Same, under slight pressure, which ruptures the cells the grumous matter escapes, shewing that each portion of the original nucleus contains in a distinct cell.
5. Rather more advanced, grumous nucleus separate.
6. Pollen, as it subsequently exists, but free from granules.
7. More advanced, 4 lines long, the appearance of ternary division results from the folding of the outer membrane; in the centre of each transparent line, is situated the pore.
8. 5 lines long, folds disappeared.
9. Perfect pollen.

Fig. II. Alabast. without the ovary, 4 lines long.
Fig. III. Alabast. 1 inch long.
Fig. IV. Alabast. 2½ inch long.
Fig. V. Perfect.

TRICHOSANTHES.

Trichosanthes sp.

Scandens, strigosa, caule sulcato, fol. cordatis acuminatis mucronato-dentatis, sinu profundo, lobis erectis basi triveniis, tactu submollibus. Cirrhi lateralis bipartita.

Racemi interpetioles et cirrhes terminales? folia superant. basi nudiusculi.

Bracteæ flores fulcientes spathulatæ dentatæ. Pedicellis plus minus cohærentibus.

MAS. Cal. tubus longissimus clavatus laciniis 5 lanceolato-linearibus reflexis.

Cor. rotata laciniis lineari-lanceolat. 3-veniis, ima basin connatis medium capillacea fimbriatis æstivat. valvata, fimbrius inflexis omnia inclusis.

Stam fauci calycis inserta tria fertilia, tubo versus sita filiformia.

Filam dua binatim composita, petalis tertio libero unico sepalo opposita brevia glabra.

Antheræ duæ biloculares, apice subpilosæ filam tertia uniloculares extrorsæ, loculis angustis, biflexuosis. Connectivum apice conicum. Pollen albidum globosum læve triporosum.

Corpora 2-3 filiformia vel omnino adnata tubo vel apice libera, an stylorum rudimenta.

Bryonia.

Bryoniæ sp.

Planta herbacea repens scandensque pilis longis rigidis hispida subpungentibus.

Rami sulcato-angulati, vernatione gyrata.

Cirrhi hinc petiolis adjecti, simplices. Folia longiuscule petiolata palmatim 5-loba. deltoideo-cordata, sinuato-dentata rugosa, hirsuta tactu scaberrima, basi sub 5-venia. Flores monoici fæminei pauci in axillis aggregati breviter pedicellati parvi inconspicui.

Calycis pars adhærens ovatis, hispidissima supra ovar. quam maxime constricta, cæterum campanulata, laciniis 5-6 lineariibus, angustis reflexis. Flos. masculus interdum cohæsionem binabis.

Corolla lutea 5-6 petala, petalis ovatis fauci insertis, laciniis calycis brevioribus sub 8-veniis utrinque breviter pilosis et dorso secus centrum pilis longioribus hispidis.

Glandula magna carnosa, annuliformes, stylo basin cingit.

Stamen rudimenta tria ad sunt calycis tubo medium versus petalis sub opposita, pubescentia.

Stylus clavatus brevis inclusus stigma magnum cellulosorugosum 3-lobum, lobis subcordatis compositis ideoque placentis opposita.

Ovarium uniloculare, placentis compositis approximatis clausum. Pl. DCXVI. Fig. VII.*b*.

Stigmata sæpius una reniformia et ovar. 1-locul. placentis 2 compositis.

Ovula pauca transversa in placentis immersa, foramen hilum prope, et oblique introrsum spectans. Tegumenta bina discreta, nuclei apex mammilliforme. Placentæ cavitatis superficies incrassata.

Fructus baccatus rubro-coccineus cerasi parvi magnitudine oblongo-rotundatus in pedicellis inarticulato apice articulatus subglaber, apice calycis basi ima subapiculatus 1-locularis.

Ovule sacculo embryonari-caudata.

Semina 00 sed parvum numerosa transversa in pulpa aquoso lactearum nidulantia sacculo arilliform carnoso-membranaceo clauso inclusa ovula, lævia albida.

Raphe inconspicua, completa chalaza indistincta.

Tegument. exterius (testa) crassum coriacea induratum intus membrana cellulosa, (teg. interiore ovuli) vestit. micropyle inconspicua.

Tegment. interius nucleare membranacea tenue vestit. altero tenuissimo (e sacculo embryonare) orto albumen nullum.

Cotyledones plano-convexiusculæ carnosæ ellipticæ basi emarginata. Radicula conicum, hilum prope. . Plumula inconspicua.

Flores masculi dispositi ut fæminea sed in axillis distinctis.

Cal. campanulatus.

Cor. campanulata magis evoluta petala basi breviter connata.

Stam. tria tube calycis apicem versus inserta, 2 composita binatim petalis opposita, tertio (vel vero quinto) singulo sepalo opposit.

Filam. brevia glabra, connectivo in apiculo brevi product. medio supero affixæ. Antheræ extrorsæ, lateraliter dehiscentes, singula vel discreta quoad filam. obliquum uniloculares, aliæ biloculares, æquilateræ ; connectivis apice bifidis, omni

barbatæ vel hispidæ, pilis conico-subulatis infra succo flavo turgidis. Pollen flavum 3-angulatum glabrum Onagraroideum.

Rudiment. Fæm. carnosa globosa.

Filament composit. fasciculi duo approximatis.

Antheræ compositæ sunt, in vasorum fasciculorum centrale petiolorum cum opposita sunt! fasciculis propriis nullis! antera discreta simplex.

The truth is however, as I have observed in one case, that the filaments of all have distinct nutriment fascicles, but in the compound ones these are so closely united to the central one of the opposed petal, that they are not distinguishable until they reach the base of the filament.

Of whatever genus this really is, it comes excessively close to Leucocodon, which differs only so far as the male flowers, and the fruits are concerned, in all the anthers (3) being bilocular, and in the pollen, I have probably mistaken, the anthers which can scarcely be three, and all bilocular.

Hab. Khasyah Mounts. Ad ripas Kundul: *Sep. 3rd*, 1836.

Zanonia.

Remarks on the Genus. Pl. DCXVII. Figs. III. VI.

Neither the fruit or flower of Zanonia appears to have been described with the requisite accuracy.

In a species lately brought to me, the fruit, is oblong clavate with a flat truncate apex, marked by three lines proceeding from the obscure angles of its margin to the centre. About two lines below the apex is an annular cicatrix, it is one-celled with three large fleshy triangular placenta tapering below, but enlarged above.

The seeds are two in each of the cells formed by the meeting of the placenta in the axis, they are truly pendulous, attached to placenta about opposite the annulus, they are oblong compressed, surrounded by a wing, narrow on the mar-

gins of the body of the seed, but produced at either end into an expansion as long as the body of the seed itself. The seed otherwise has I think the ordinary characteristic structure, except the commissure of the cotyledones is very indistinct, and only to be recognised in a very thin transverse section.

The dehiscence takes place along the 3 lines visible in the flat summit: and the 3 valves so formed, which are internally thick and fleshy at first, and as it were continuous with the placentæ, become by the drying of the tissues, inflexed.

The remarkable points, and such as I would enter in the generic character, are the three large elongated triangular placentæ, the 3-valvular dehiscence of the apex, the inflexion of the valves, binary and winged seeds.

According to Arnott's definition the wing of the seed is considered as of secondary importance, but to me it appears remarkable, not only because I know of no tendency to the formation of a wing in any plant of the order known to me, but because in many, the margin in Zanonia so much developed, is channelled or grooved deeply, so that I would rather have expected two wings, one on either side of the actual margin, than such a one as exists in Zanonia.

The seeds of cucurbitacea, so far as I know present either a blunt simple margin, or a grooved one, the first may perhaps be taken as an argument against a tendency to be winged, the second would seem to indicate the possibility of the occurrence of two wings, in either case Zanonia is remarkable.

Capsula infra apicem annulata, imo apice trivalvis demum valvis inflexis placentæ trigonæ maximæ. Semina two cuique placentæ pendulæ, marginatæ alatæ.

Fig. III.

1. Very young flower bud.
2. Shews the stigmata and placentæ, the spaces between the

stigmata corresponding to the narrow slit-shaped spaces between the placentæ.

3. Same laid open, shews the correspondence of the stigmata with the placentæ, *a*, *a*, *a* curious processes, forming a sort of annulus of which I am quite ignorant.
4. Transverse section of the same, there is no peculiarity between it and other young placentæ, except that the placentæ are so approximated as to occupy all the ovary.
5. Shews correspondence between stigmata and placentæ, in the developed bud, the stigmatic lines are now continuous, *a*, the line of passage inwards of the stigmatic tissue, and between the placentæ.
6. Shews the same, but in this, what I consider the true stigma is opposite us, *a* line of inflextion.
7. Transverse section of same with reference to no. 5.

June 16th, 1841.

In Zanonia each stigma belongs to its own carpel, but in Coccina it belongs to different carpels, see Pl. DCXVII. Fig. VI. The margins thus stigmatic have no connection necessarily with the placenta.

Zanonia clavigera, Pl. DCXVII. Fig. IV.

Flores (fæminei) virides, ovarii clavata more fere Caryophillorum) articulato in pendicellum brevissimum suffultum bractea obsoleta.

Sepala 3, raro 4, 2 binatim composita, paullo majora, bivenia, tertium univenium, semi-rotundata marcescent. Petala 5, carnosa, ochroleuca intus papillosa cordato-ovata æstivatione valvata acutiuscula caduca.

Stam. sterilia glandiformia 5, situ parum regularia (not always present, when so, they may be taken into account for ascertaining the situation of the sepals, to which they will be opposite.)

Ovarium obsolete angulatum glaberrimum $\frac{4}{4}$ inferior, $\frac{1}{4}$ above the attachment of the floral envelopes, trigonum, et planum, lineis tribus ex angulis ad centrum currentibus notatum.

These lines run into styles, diverging towards their apices, the space occupied by stigmatic tissue.

Styli ad angulos siti, brevissime, stigmata totidem exactly-like short ram's horns inflexed.

Ov. triloculare, ovula cujusque locula bina, pendula ab apice, l utrinque fissura (incompletæ junctionis) ordinis, memb. inter collum proficiens, the cell is opposite the flat faces not practically existing, owing to the size of the placentæ, which starting from a narrow attachment at the angles, fill the whole cavity, being besides mutually closely adhering. This triangular mass, so resulting, presents traces of composition in the shape of the usual lines* indicating placentary composition, which lines are alternate with the angles. Towards the points of union in the axis, each presents a transverse subreniform mark of vascular fibrous tissue.

At the apex of these composition lines are found the ovula, one on either side, a short distance below the base of the styles, pendulous, closely appressed to the mass of placenta.† Now in this case it would seem that the cells of the ovarium correspond as usual with the styles, that the ovula are attached to the margins of the placenta, which are produced inwards into a confluent mass, the study of the development will alone shew whether this is the proper explanation, or whether the placenta in this are continuations of the axis, united along certain lines to the carpel leaves.

Or we may take the parts between the styles as the carpel leaves, which also appear to be indicated by the lines in the vertex of the ovarium.

In this case, the placentæ will have contracted an adhesion with the midrib or central line of the leaf, and the stigmata of each carpellum will be completely separated.

* These lines correspond with the styles, and so with the stigmata, consequently the centre of the cells of the ovarium corresponds with the styles.

† Three lines of composition remaining instead of six, and these lines shewing the lines of union of the placentæ of the same carpellum, the others being quite deficient.

I have no doubt, but that the styles and stigmata occupy their usual place *i. e.* the dorsum of the leaf, and that the furrow running along the venter of the style, which dilates above, giving exit to the stigmatic tissue, is the ventral suture, and that the ovula are attached to the margins of this, at the apex of the cavity of the ovary, and that below this, the placentæ of the same carpel are united, but still present traces of composition, and that the only anomaly, if it is one, is that there is no trace of the composition of the placentæ of the contiguous carpels.

In this case the situation of the vasc. bundles of placental mass is proper, that is belonging to the margins, (being compound necessarily.)

If the other explanation that the spaces between the styles are the carpel leaves, be assumed, then the line of inflection ceases to be marginal, or rather is not along the axis of the leaf, as is always the case, and the placentæ arise from the midrib, and bear the ovula, which would be all quite contrary to analogy; and what is still more important, the stigmatic tissues, in this case compound, would have no theoretical connection even in direction with the ovula or placentæ, but a line continued downward would traverse the centre of the ovarial cell.

Pl. DCXVII. Fig. IV.

1. Female flower.
2. Same petals removed or fallen off.
3. Apex of female flower seen vertically, shews the composition of the sepal, the sterile stamens and appearance of the apex of ovarium. The situation of the 5th, or simple sepal not ascertained properly.
4. Long section of upper part ovarium, *a* fissure of marginal non-cohesion, *b* cell, *c* ovulum.
5. One of the cells cut away up the back of the style, shews the fissure of non-cohesion, and situation of ovula.

6. Transverse section of ovarium, corresponding in situation with fig. 3, close to insertion of envelopes.
7. Another of same much lower down, and below the ovula.
8. An ovulum.
9. The same outer tegument for the most part removed.

Actinostemma.

Pls. DCXIV. DCXV.

Planta dioica. Herbacea annua scandens.

Caules elongati, angulati sulcati, crassitæ pennæ corvinæ, parce puberuli, tenera succulenta plantæ fæminæ multo magis evoluta.

Folia alterna longiuscula petiolata, exstipulata, juniora cordato-hastata, 3-loba, lobis lateralibus, subbilobatis, grosse dentata, dentibus mucrona terminalis, dentibus basilaribus singulis, vel binis utrinque glanduliferis, acuminata, saturato-viridia utrinque ad venas puberulo hirta, basi palmata 3-venia, venis lateralibus cito bifurcatis secondariis inconspicuis mutuo arcuatim anastomosantibus, pagina cæterum areolata reticulata, infera tantum stomatosa.

Petioli sesuncialis supra canaliculato-puberula.

Cirrhi solitarii hinc basi petioli quasi adjecto, spiraliter torta, apice bipartita.

Inflorescentia utriusqus sexus axillaris, mascula racemoso-paniculata. Paniculis filiformibus elongatis folia fulcientia aliquoties excedentibus ab ima basin ramosis, ramo sæpe æquante, sulcatis puberulis, ramis divaricatis racemosa plurifloris.

Bractea subulata minuta ad basin cujusque divisionis et cujusque pedicelli.

Pedicelli medium infra articulati, si solitarii semper hinc basin rudimenta alternis stipata, puberula parte infra articulum persistente.

Flores caduci, inconspicui, viridii lutescentes, inodori, evolutione centrifugi.

Cal. rotatus profunde 5-partitus, laciniis basi obsolete saccatis, lineari-lanceolatis acuminatissimis patentissimis, acuminib. subrecurvis, extus puberulis, univeniis, æstivatione valvatis.

Pet. 5 sepalis alternantia, fundo calycis inserta breviter unguiculata e basi lanceolata acuminatissima patentissima, univenia, æstivatione subimbricata, ungue et limbi ima basin cum calyce cohærente, marginibus ut etiam sepalorum glanduloso-denticulatis.

Stam. 5 imo fundo calycis inserta, omnino discreta, sepalis opposita, inclusa. Filamenta breviuscula filiformia.

Connectivum glanduloso-papulosum, viride. Antheræ adnatæ uniloculares extrorsæ, longitudinaliter dehiscentes.

Pollen luteum lanceolatum plicatum, immersum globosum granulosum ; plicis expansis membrana interna apparent.

Rudiment fæmin nullum.

Flores fæminei racemosi, racemis paucifloris sæpius unifloris, flora unico in omnibus tantum evoluto. Pedicelli florem prope articulata, bracteæ ut in mare Calycis tubus subglobosus verrucosus, limbus corollaque ut in mare sed laciniæ magis reflexæ, sæpius caduca interdum marcescunt et serius labuntur.

Stamina ut in mare sed minora interdum castrata.

Ovaria 2, 3 inferum, parte libera conica verrucosula, 1-loculare. Placentæ punctiformes, nulla septa.

Ovula 2, 4, sæpius 4 pendula ab apicem loculi, si 4 bina ab utroque latere. Foramen superum hilum prope. Tegumenta bina distincta, interum inclusum.

Stylus crassus brevis, leviter complanatus demum amliatus, parce puberulus, stigmata bina approximata hippocrepidiformia, vasorum fasciculi plures, 3, 4 minores circa atus externis unici majores centrales dispositi, styli centrum omnino evasculosum.

Fructus pendulus, (pedicello infra articulam gracili, supra

incrassato, petiolo breviore) ovatus obtusissimus apicem versus leviter attenuatus, apice stigmata reliquis minimas sphacelatus gerens, aculeis viridibus complanatis et præsertim annulum infra valde echinat. apice subglaber, tactu lævi ad annulum circumscissus! unilocularis 2, 4 spermus, mesocarpium celluloso spongiosum crassum album, rugoso.

Endocarpium cellulo-membranaceum tenuissimum, e cellulis angustis quam maxime irregularibus forma situque conflatis, superficiei intus rugosa.

Placentæ obsoletissimæ, septa sæpius nulla, rarius obsoletissima.

Semina 2, 4 sæpius, 4 pendula atro-brunnea, demum brunnescente tactu saponacea, valde complanata, superficie valde irregulare rugosaque hinc utrinque profunde sulcatis, marginibus varie dentatis, hilum minima micropyle parum conspicua.

Testa fragilis, diplœ alba cellulosa, margines versus crassa.

Tegumentum interius celluloso-spongiosum album superficue venoso-reticulatum et exaratum, venis e raphe fere completa utrinque ramos exserente ortis, irregulariter divisis sæpius distinctos, interdum anastomosantes, inferioribus cæteris duplo longioribus.

Tegumenta 3tiam (nucleare) tenuissimum celluloso-membranaceum læve, hinc apice longiuscula apiculato excepto, adnatum.

Albumen nullum.

Embryo inversus, quoad fructu, orthotropus quoad semen.

Cotyledons ovales carnosæ plano-convexiusculæ, faciebus lateribus seminis parallelæ, ideoque raphi alternantes. Radicula conica acuta breviuscula, basi utrinque breviter auriculat. supera hilum prope.

Plumula conspicua.

Adest etiam membrana tenuissime inter cotyledones, ob cotyledoues initio divaricatissima.

This membrane is nothing but the originally cellular portion of the embryonary sac that intervenes necessarily be-

tween the cotyledons, which are in their young stages very divarcate.

Huic genus proximum constituit planta cujus mas. hucusque tantum visa. Scandens tener, petiolis canaliculatis marginibus canaliculæ dense ciliatis, foliis ternatis, foliolis lateralibus binatim divisis, cirrhis hinc petiolis adnatis simplicibus vel bipartitis, floribus masculis paniculatis, paniculis compositis folia sæpius longe excedentibus, calyce 5-partito, laciniis brevibus obtusis. Petalis lanceolatis acuminatissimis, staminibus monadelphis, filamentis omnino connatis, antheris unilocularib.

Pl. DCXV.

1. Male alabastrum very young.
2. Ditto more advanced.
3. Ditto a little before expansion.
4. Ditto one sepal removed from the base of its free portion.
5. Stamen of ditto lateral view.
6. Ditto front view.
7. Ditto back view.
8. Pollen.
9. Ditto immersed.
10. Lateral view of male flower.
11. Ditto vertical view.
12. Stamina of ditto and the base of the calyx and corolla.
13. Very young fruit. 13*a*. ditto long section, one ovula in situ.

13*b*. Ovulum, 13*c* ditto long section, 13*d* ditto its embryonary sac with its long membranous tube, 13 ditto with apex of nucleus.

14. Young fruit.
15. Ditto nearly mature.
16. Ditto mature dehisced.
17. Ditto upper portion with the seeds in situ.
18. Seed outer view, 18*a* ditto inner, 18*b*. ditto lateral.
19. Ditto long section.
20. Embryo.

21. Ditto one cotyledon removed.
22. Radicle and plumula, removed with a portion of curious growth of one cotyledon, resembling a rudimentary convolute leaf.
23. Long section of seed, embryo removed, *a* testa, *b* its white diploe, *c* nucleary spungy membrane, lined by the embryonary sac excessively fine, the free apiculate apex of which is seen at *d*, *c* second integument, on its surface, but not ramified in it, are the vessels of the testa, *d* free apex of the nucleary membrane, this adheres in other parts slightly to the second integument.

Pl. DCXIV.

1. Female flower lateral.
2, 3. Two views of the same, perianth removed.
4. Transverse section of style.
5. Longitudinal section of ovarium, parallel to the stigmas.
6. Ovulum of ditto.
7. Do. long section, 6*a* 4 ovula in situ, raphe alternately situated inwardly.
8. Young fruit, just after fall of perianth.

8*a*. Ovula of do., 8*b* do. long section.

9. Young fruit, long section of.

9*a*. Ditto ovula removed, 9*b* ovulum of do. long section.

9*c*. Apex of nucleus of do., this has a long apiculus, and seems to be traversed by a canal, to its apex is attached no doubt portion of a pollen tube. The embryonary sac for the most part is exposed.

10. Long section of ovula more advanced, embryo just appearing.
11. Do. still more advanced, 11*a* embryonary sac of do.

11*b*. Embryo removed.

12*a*. Embryo, *b* nucleus now much reduced in dimensions, *c* testa, *d* inner integument, *e* Embryonary sac filling the cavity of the nucleus and itself, entirely with cellular watery tissue.

Hab. Chykwar in sylvis infra articulatis, Assam name Temeejoora.

Pet. æstivatione gyrata vel incurvato-involuta, leviter imbricata. Fl. masc.

Calycis laciniæ breves. Pet. lanceol. acuminatissima, æstiv. involuta. Stam. monadelpha.

Planta scandens. Habitu Cissi vel Vites.

Triceros.

Scandens glaberrima, foliis longe petiolatis pedalis reptenis foliolis lanceolatis inciso-serratis dentibus mucronulatis cirrhis oppositifol. sæpius simplicibus apice petioli puberulo.

Fl. fem. fasciculat. longe pedunculat. calycis laciniis 5 subulatis persistent. petalis 5 ovatis acutis, styli 3 apice bifidis.

Fructu subtrigono-campaniformi apice truncato plano. Stylis 3 persistentibus cornuto apice dehiscente 1-loculo, ex abortivum unius seminis dispermo, seminibus crassis oblongis margine incrassatis rugosis nigris amarissimis.

Fl. masc. racemosis, in apice ramorum sæpius difloratorum, quasi axillaribus sicut paniculam longissimam formantibus, fl. breviter pedicilllatis pentameris sepalis petalisque pubescentibus viridescentibus ut in fem. Stam 5 liberis.

Hab. Himalaya near Budrinath, M. Edgeworth.

Descrip. Perianth. basin versus coalit. planum 10-partitum, sepala 5 lanceolata acuminata denticulata. Pet 5 alternant. pluries majora sepalis lanceolato-acuminata, margine denticulato fimbriata, 1-venia, venia 2 lateralibus dimidiatis abortivis. Pagina processubus cellulosis.

Stam. 5 basin ima connato in discum centraleam planam carnosam, extrorsa, sepalis opposita. Filamenta crassa brevia, evasculosa antheræ terminales vel uniloculares, fissa extrorsum dehiscentes vel bilocellatæ. Pollen glabrum.

Rudiment fæm. 0.

Flos. fæmineus, 10-partitus, tubo perianth oblongo-clavat. laciniis linearibus reflexis, sepalis duplo brevioribus angustis-

simis. Pet. longissim. acuminatis, discus styloram basin conjungens planus carnos. Styli 3 sepalis oppositi, duobus incurvis simplicibus. Stigmatibus 2 setaceis recurvis.

Fructus late clavatus, apice quasi truncat. cornubus tribus (e stylis induratis) recurvis, capsularis, extus venosus, interveniis celluloso-reticulatis.

Semina 2 pendula, 3tio abortient. oblongo-quadrat. compressiuscule utrinque rapheos margine clavato rugoso.

Raphe completa, simplex? Testa coriaceo chartaceo. Embryo ordinis.

Sepalis evasculo-cellulosis. Pet. vasculo-centrale complete, lateral. incomplete dimidiatis.

Planta volubilis cirrhifera, habitu Cissi, fol. carnosiusculis pedalis, foliolis angustiuscule dentatis lanceolatis. Racemis flor. fæm. nutant. paucifloris bracteis linearibus subsimplicibus, flor. masculor. longe et anguste paniculatis.

Stam rudim 0, in flora fæmineo. Styli 2, $\frac{1}{2}$ sepalis $\frac{1}{2}$ petalis opposit. 3tio petalo omnino opposito.

Obs. On what principle is an anther like this explainable? The bilocillate form is riducible to the genuine bilocular (quadrilocellate) by assuming the secondary septa to be deficient.

And the only manner I know to reduce the genuine unilocular anther to the ordinary type, is to assume the antheral leaflet margins as entirely coalescent.

The true modification of anthers requires examination. It is at once obvious, that a quadrilocellate anther cannot be well explained if we assume the lines of dehiscence as corresponding to the lines of inflection of the margins of the leaf. To explain them in that way, 4 leaflets are required for each and all on the same plane, which is contrary to analogy.

The septa are the last things formed probably by having a different origin and analogy.

GUTTIFERÆ.

Calophyllum.

1. *Calophylli* sp.

Calophyllum, glabrum gemmis ferrugeis puber except. fol. oblonga, in petioli attenuata obtusissime margine undulata, racemis sæpius 2 3 fasciculatis, foliis dupl. triplo brevior, floribus suboppositis, sepal. petal. duplo minorib.

Ramuli compressi, virides. Petiola 6-7 linealis : lamina oblonga, obtusa basi attenuata coriacea margine subundulata venatio solita 5-6 uncialia long. lat. 2 uncial. patentia venatio solita.

Racemi axillares, foliis brevioris vix ultra digitum longe sæpius 2, 3 fasciculat., raro solitaria albida. Pedunculus tetragonus compressus major centralis supra medium ramosus, floriger subglabris erectus pediceili 3, 4 lineali subquemque bractea squamiformes.

Flores parvi, albi adoratissimi sæpius solitarii. Perianthium reflexum.

Sepala 4 oblonga concava petaloidea.

Petala 4 obovato-rotundata concaviuscula duplo minora.

Stam. 00, petalis subduplo breviora filamenta filiformia basi subcoalita. Antheræ oblongo-ovatæ, bilocul. longit. dehiscentes.

Ovarium globosum, viride, glabrum parietibus crassis. 1-loculare. Stylus filiformis, robustus stamina longiora paullo excedent flexisosus. Stigma discoideum. Ovulum 1 basi loculi affixum, atropum.

This appears to approach C. Bintangor in the shape of the leaves, but judging from Wights Monog. of the Indian species is not described.

2. *Calophyllum Inophyllum.*

Arborea. Paniculis axillaribus terminalibusque pedunculis pedicellisque albis, floribus albis, suavissime odoratis, odora rosaceæ, antheris luteis. Ovarium rubescens.

Cal. 4-sepalus, sepalis petaloideis 2 interioribus anticiposticisque majoribus in petalis sæpe abeuntibus.

Pet. totidem sepalis alternantia, æstivatio imbricata.

Stam. 00, polyadelpha, adelph. ima basin coalitis. I vel plura et tunc angustiora staminib. aliquod nempe abortivis. Filam. libera subulata, apicibus viridescentibus. Anth oblongæ bilocul. longit. dehiscentes. Pollen ovatum læve hinc sulcatum. Stylus filiformis, stigma peltatum sub 3-angulare, ovarium 1-loculare 1-ovulat. ovulo erecto foramen inconspicua hilum prope.

Pl. DLXXXV. A. Fig. IV. Ovula at a much later period, bud about $\frac{1}{2}$ developed.

At an early period the foramen is distinct as are likewise the coats of the ovule, the primine is very thick and grumous, which renders the secundine and nucleus still more difficult to be seen.

HAB. Mergue an culta.

GARCINIA.

Garcinia.

Arborea 30 pedalis, ramulis pendentibus viridibus, fol. lanceolata vel ovato-lanceolata obtusis, subrepandis coriaceis venis secondariis non conspicuis rubro-luteoque coloratis vel pallide viridescent, floribus axillaribus et solitariis vel sæpius terminalib. 3-4 aggregata, in pedicellis petiolorum circiter longitudinis.

Sepal 4 rotundata, 2 exterior, cum pedicellis rubro-sanguineis, interior ochroleucis, nervo medio, rubro-sanguineo.

Pet. 4 subæqualia obovato-rotunda, ochroleuca (waxy.)

Stam. monadelpha, ovario mediante toro adnata, 00, in corpus 4-lobatum, carnosum, unita filam. libera facta brevissima. Anth. bilocul. longit. dehiscentes loculor marginibus repandis, stylus crassus, stigma magnum peltato-capitatum.

Ovarium, loculare, loculis 1-ovulatis ? ovulis pendulis. Pl. DLXXXV. A. Fig. XII.

Pars *a*, an styli pars an potius, pars tubo staminei lateribus ovarii stylique adnato et usque ad stigma attingentis, flores suaviter odorat.

In sylvis Mergue: *Oct.* 1834.

BIXÌNEÆ.

Bixa.

Bixa orellana.

Frutex foliis cordato-ovatis acuminatis basi 5-nerviis, longe petiolatis pellucida reticulatis impunctatis.

Paniculis subcymosis terminalibus ramulisque junioribus ferruginea velutinis, floribus magnis odoratis carneis. Bractea membranaceis concavis ad basin pedicellorum.

Cal. basi involucellatus ? involucellis 5-partitis laciniis glandulosis, sepalis oppositis 5-sepalus, sepalis membranaceis æstivatione imbricatis.

Cor. 5-6 petalo, petal sepalis alternant. patente reflexis obovatis, integris bifidisve æstivatione imbricatis basibus lutescente apicibus carneis.

Stam. 00, hypogyne libera, filam. capillacea. Anth carneæ basi affixæ, biloculares apicibus poris 2 dehiscent. Pollen lanceolato-ovatum læve hinc sulcatum.

Stylus complanatus subclavatus. Stigma bilabiat. ringens.

Ovarium hispidissimum 1-loculare placentis 2 parietalibus. Ovula 00, subascendentia foramen hilum prope.

Capsula pilis subulatis viridi rubescent hispidissima inflato, endocarpium mesocarpio separatum semina 00, placentis 2 parietalibus affixa.

Tegumenta subbaccat. succo miniato fæta, externis apice cicatrizatum (nec micropyle) sed chalaza, funiculis albis ad basin seminum in corpore peltato expansis (arillo parvo). Albumen carnosum, embryo axillis. Cotyledones foliaceæ planæ.

Radicula hilum versus. Plumula inconspicua chalaza intus tumida, subcallosa, adeo ut cotyledones apices deflectantur.

Culta frequenter apud Mergue : *Nov.* 1834.

2. *Bixineæ* sp.

Arbuscula ramulis minute verrucosis, foliis alternis exstipulatis breviter petiolatis ovato-lanceolatis, obtuse acuminatis, impunctatis, basi 5-nervis junioribus discoloribus lividis lucidis, basi 2-glandulosis, coriaceis, subrepando-dentatis.

Racemis axillaribus, foliis multo breviorib. albido-velutinis bracteis ovatis minutis ad basin cujusque pedicell. Pedicellis brevibus albido velutinis medium versus articulatis ibidemque bracteolatis, floribus albis odoratis ob staminibus conspicuis.

Cal. 5-sepalus, sepalis albidis subpetaloideis velutinis.

Pet. totidem sepalis alternantia conformia, paulo minora æstivatio tegument cujusque aperta.

Stam. 00, hypogyna libera, filamenta capillacea inæqualia. Anth. subversatilis bilocul. longit. dehiscent.

Stylus crassus filiformis staminibus brevior. Stigma capitat. sublobatum medio foveolatum.

Ovarium superum, 1-loculare, placentis 5, parietaliebus, ovulis pluribus cuique placentæ, pendula foramen ad hilum. Pl. DLXXXV. A. *Fig.* XIII. *a* wall of pericarp.

Hab. Ad littoram. Ins. Pulo Gewen : *Nov.* 1834.

FLACOURTIACEÆ.

Gynocardia.

Gynocardiæ sp.

Arbor magna, cortice ramorum griseo, fol. alternis exstipulatis oblongis cuspidatis obtusiusculis integris coriaceis, subtus

glaucescent. Petiolis articulatis in ramulis supra planiusculis, fructibus maximis in pedunculo ligneis 1½ uncialib. crassis globosis aurantia magna magnitudine nudis, apice depressiusculis, extus suberosis grisco-brunnea, cortex 1½ linea crassa lignea dura, massam carnosam. Semina 00, plura maxima in substantia cellulosa nidulante, veri similiter sine ordine evidenti disposit. ovato-oblonga, materia gelatinoso. solida diaphana inclusa.

Testa atro-coriacea dura. Tegument. interius membranaceum tenue, albumen copiosum carnosum album arcte vestiens.

Embryo in axi albuminis, orthotropa quoad directionem radiculæ brevis obtusæ teretis hilum versus. Cotyledones planæ contiguæ carnosæ foliaceæ. Plumula inconspicua, cavitus albuminis embryonifer membrana tenuissime vestita. Cotyledones oblonga directione diamet. longioris, seminis parallelæ. Hilum parvum. Testa extus lineata rugosula, an ideo testa baccata. Pl. DLXXXV. A. Fig. IX.

Hab. Assam at Suddyah: *Jan. 9th*, 1836.

Flacourtia.

Flacourtia edulis.

Fruit the size of a large cherry, annular at the base and with the remains of the perianth: apex depressed, umbilicate surrounded with the persistent unchanged styles and stigmata smooth, externally reddish with green streaks, baccate with as many cells as there are styles, each filled with pulp in which, the solitary and binary pendulous seeds nestle.

Seeds much compressed, testa thick indurated nearly bony, inner tegument very thin brownish membranaceus.

Albumen copious fleshy. Embryo with the radicle next the hilum, and consequently superior, with flat foliaceous cotyledons cordate at the base. Plumula inconspicua.

Hab. Malacca, habitus foliatio armat. Flacourtiæ, fl. masc. Getonia.

Evidently akin to the S. African genus Dovyalis vide Arnott Journal Botany, Vol. III, p. 251.

LORANTHACEÆ.

General Remarks.

There can I think be very little doubt that the following Orders form a very natural group, Santalaceæ, Loranthaceæ, Olacineæ.

The presence or absence or the corolla cannot be admitted as a valid objection, because although most Loranthaceæ have a highly developed corolla, there is no trace of it in Viscum.

Olax, although it has a superior fruit, and so like in appearance to an inferior one, that dissection must be resorted to, to detect the difference.

Olacineæ are widely displaced by all authors except the illustrious Brown, who long ago pointed out its great affinity to Santalaceæ.

Its affinities with Aurantiaceæ and Sapotaceæ are purely imaginary. The Order points out the tendency that exists to suppression of part or the whole of the outer series of stamina, which is so complete in some Santalaceæ, and all Loranthaceæ : what is the cause of the presence of a glandular disk so frequently among Epigynous Orders.

No vessels exist in the corolla of Schæpfia opposite the sinuses. The style has 3 vascular fascicles, it will be worth while to apply the test of situation of carpella relative to the calyx, or at least supposed calyx of many plants, if these have really calyces, the carpella will alternate with them, owing to the law, that no two organs of similar denominations can be opposed to each other.

The above Orders agree in the following remarkable parti-

culars, valvular æstivation, opposition of stamina, composition of ovarium, structure of placentæ and reduction of the usual parts of an ovulum; this being carried to its maximum in Loranthaceæ, the differences of albuminous seeds are non-adhesion of calyx in one, but this may be explained away, and the development of corolla, which as it is irregular, is of less account.

Santalaceæ are usually supposed very nearly akin to Elæagneæ and other Tubiferous classes, but the affinity may not perhaps be so very close to Proteaceæ. Thymeleæ, and Elæagneæ have simple ovaria ;a sign of much consequence. Lindley places Anthobol eæ among Thymeleæ on account of its superior fruit, but as it agrees otherwise with Santalaceæ, it will probably serve to point out, that the ideas I have above noted are very natural.

Choretrum is stated by Brown to have a very minute 5-partite calyx, I say from analogy that its perianth is more colored than those in which no calycule exists. Quinchamalium has an urceolate bractea, totally distinct from the ovary, and this is rightly considered by Brown as an argument in favour of the perianth of the related orders being calycine. This instance I take to be most important, for it explains away the greater part of the anomalies, for the bractea cuculliformis of Quinchamalium is obviously akin to the calycule of Loranthaceæ, the same of Schæpfia, the same perhaps of Olacineæ.

As Brown says it is probable that the perianth is calycine not corolline, because of the valvate estivation, an uncommon occurrence among truly petalous orders. Then he notices Viscum and Loranthus.

The look of the perianth of Schæpfia is not at an early period continuous with the calycule, if it be strictly so, it must be calycine.

A genuine calyx must be continuous with the outer structure of the part of which it is a development, if it be not

it is corolline, belonging to the glandular system ; see Brown's Obs. on the analogy of the perianth of Quisqualis and Combretum.

Loranthus.

Loranthus concavifolium Gr. Scurrulæ sect.

Attachment simple, plant pendulous.

Tota planta furfuraceo pubescent præsertim fol. subtus furfura e pilis ramosis pallida.

Fol. alterna vel subopposita, basin subtus nitentibus et senioribus glabratis, fragile, brittle, cordate, ovato-oblonga sæpius concava, integra obtusa carnoso-coriacea, venis secondariis inconspicuis.

Novellis albidis, novissimis ferrugineis, vernatio concavo-conduplicata, racemis subcymiforme aggregatis in axillis velustioribus, foliis brevior, fl. 1-bracteata basin ferrugin pilis cinct.

Calyx clavatus ore truncato extus ferrug. tube of corolla sub oval-shaped compressed above near the calyx gibbous (curved upwards) estivation of bud much greater, bud subcylindric except the knobbed apex.

Corolla 4-fida, fissura postice profundior, laciniis erecto-incurvis pallide viridescent.

Filam. complanata sursum latiora ad exsertionem angustata, rubror sanguinea. Anth subovatæ, Stylus longitud. stam. Stigma capitat.

Fructus (junior) clavata.

Hab. Malacca, in Rhizophoreis mangrove woods on Soneratia.

From descriptions it is impossible to determine, it approaches closely both to L. scurrula and chinensis, from which it differs in single attachment, leaves subalternate concave, coriaceous brittle above shining, and when mature very smooth, in the flowers pale inside, laciniis inflexis.

Dicatur L. concavifolium, if this be found a permanent mark, for I have only seen one specimen.

The phenomena of fecundation are those of L. bicolor. the sacs are of great tenuity, the cavity of the ovarium appears blocked up, the embryo base is on a level with the base of the cotyledons.

2. *Loranthus farinosus*, Pl. DCXX., or L. incarnatus, Jack, for the young shoots and leaves are covered with ferruginous pubescence, although otherwise it does not agree with his description.

The embryo sacs reach up the style a good way nearly to the stigma, often, and generally it presents the same phenomena as L. bicolor. The chief anomaly consists in the soft mucilaginous nature of the cells first developed, their adhesion to the embryonic mass, the preponderance of this body at an early period, the exceeding distinctness of the inner tubes, not only separating easily from the sacs, but from each other. The embryonic tissues appear to commence from the inner tubes at the termination of the sacs. It presents the same development of cellular tissue from unfecundated sacs, the same engagement of 2 pollen tubes, the abortion of some of the sacs occasionally, the same fundus to the ovarium, the same composition of the embryonic mass.

The young fruit is hard, the fibrous or hard outer layer being produced inwards in a ruminate manner.

The embryo sacs become enlarged subsequently, but no albumen seems to be formed in their cells. L. oleoides, presents the same phenomena as L. globosus.

Pl. DCXX. Fig. I.

1. Raceme and alabastrum of Lor. farinosus or incarnatus.
2. Flower, slightly increased.
3. Upper part of perianth laid open.
4. Base of pistillum and its bractea.
5. Stigma.
6. Long double section of ovarium during expansion.
7. Lower parts of style of ditto with two embryo sacs.
7*a*. Head of one of the embryo sacs of the same ovarium.

8. Long double section of ovary after the fall of perianth.
8*a*. The seed, developing of the same.
8*b*. More magnified two of the inner tubes have separated from their sacs which were torn away.
9. Embryo more developed, no longer adheres to the cellular tissue, grown from the sac.

The same Pl. DCXX. Fig. II.

1, 2. Heads of 2 unfecundated sacs, they are more dilated than any others, I have yet seen.
3, 4, 5. Front, back, and lateral views of the anther.
6. Young seed, even now the embryo exceeds in bulk the soft albuminous tissue, the curvature of the inner tubes is of frequent occurrence.
7. Ditto more advanced after the action of nitric acid.

3. *Loranthus pentapetalus*, Pl. DCXXIV.

Foliis oppositis glabris undulatis concavis (ob conduplicat) sub lanceolatis obtuse acuminatis venis inconspicuis coriaceis.

Racemis sub spicatis ambitu cylindraceis, axillis solitariis vel 2-3 fasciculat. ascendent. (the plant is pendulous) floribusque vivid coccineo-sanguineis.

Pedicello brevissimo inferne 1-bracteæ. Fl. 3-linealis calycis tubo subcylind. ovato, ore minimo ciliatulo annulifor. sub integro ambitu pentagono.

Per. urceolatum tubo globoso 5-angulato laciniis totidem alternis reflexis spathulatis, (vero) 6-petalum petalis infra medium dilatat. ad exsertion filament constant. filam. laciniis breviore alba. Anth. adnat. revolutis luteæ.

Stylus stam. paullo brevior. parte in urceolo floris recondit. incrassato 5-gono cæterum constrictiuscul. cylindraceo, basi rugosa.

Alabast. basi amplato 5-gono supra clavato, juniore axi (racemo) adpressa. Infloresc. evoluto inverse.

1. Plant natural size. (Fig. I.)
2. Alabastrum.
3. Expanded flower.

4. Petal. and stamen detached.
5. Anther in front.
6. Ditto back.
7. Anther after dehiscence.
8. Pistillum.

Hab. Malacca in arborib. It belongs to L. bicolor section.

Spec. char. Fol. oppositis vel alternis lanceolatis undulatis.

Racemis spiciformibus axill. solitariis vel aggregatis pedicello brevisibus deflexis apice 1-bracteat. Per. basi globosa 5-gona 5-petala. Stylus infra medium angulatus. Bacca ovato-oblonga.

Valde affinis L. coccineo.

Obs. In Loranthus pentapetalus the circumstances attendant on the development of an albumen, as well as of the embryo are obscure, I have seen tubes entering into the head of the sac, and I have after the fall of the style found them in the ovarial portion of the same organ, but after they are scarcely detectable up to a period when the albumen has attained a considerable size, and then what is very remarkable, the funicle of the embryo consists for the whole of its upper part, of a simple tube, other less remarkable anomalies consist in the ease with which the albumen, even from its commencement almost separates from the sacs, and perhaps in the lateness in which the tubes, and the single funicle of the embryo become invested with a proper membrane, or is really tubular.

Pl. DCXXV. Fig. I. Even at this period which is first after the fall of the style, the cellular mass appears quite free, it is invariably terminated by a single conical cell.

The sacs are now withered, adhere closely to parietes of the cell.

They are attached to the apex of the mass, although from the production of the cells upwards, this is obscured, and even becomes somewhat lateral. Subsequently the inner tubes exist in some, after which they reach to the mass, they

are more obscure in this, than in any instance I have yet met with.

I have not been able to trace them into the mass, although the lax smaller cellular tissue at the apex of this, obviously represents the embryo as it exists in others of same type, and this is the more remarkable because the more developed embryo I have observed sometime back to be most distinctly filamento-funicular. *a* green, *b* red, *c c* sac.

Fig. II. Cavity occupied by a cellular body, above with large simple empty cells, below with more numerous, and more close with granules. This body is connected above with at least some of the sacs.

Composed of dense red cutis, the dense green rather thick tissue, the rest white first a layer thickest below the young viscum curved and thickest above the dense central tissue.

In this instance one tube was seen applied to the cellular mass, but no tubes were seen inside it, nor were any seen in the mass itself.

Fig. III. Cellular mass upper $\frac{1}{3}$ laxly cellular cells large in 2 series lower, two thirds densely cellular uniform with an opaque central line caused by the embryo.

This embryo consists to the top of a long clavate irregular filament containing green globules the large and short cells intervene, then the long tissue of the base of the embryo, the collatral tissue only commencing.

The filament does not reach throughout the mass but ceases at the denser tissue, it never presents traces of composition. *a* opaque cells, *b* transparent, *c* green, *d* red.

The anomalies are great, upwards the production of cellular tissue, in the great size of young albumen before the embryo appears, its lateral attachment, in the late appearance of the inner tubes, and in the simple filament of suspension.

Fig. IV. In this instance a flasque lobe without tubes was attached to one side, the mass had the usual shape. In the centre $\frac{1}{250}$ shewed 2 fine tubes which projected beyond the

lower end, and of these one was swollen into a ball. The point whence these tubes originated was not seen.

Their observation is very obscure, for in a structure of this sort if they run along the intercellular lines, they can scarcely be seen.

Fig. V. The nipple is very evident, and terminates the central column of amylaceous tissue, its apex corresponds with the lower orifice of the stigmatic canal, its appearance is altogether nucleary.

This nipple is visible up to a period just antecedent to opening of the flower, it has the same shape but appears to be hollow. *a* vessels, *b* fuscous, *c d* reddish, *e* green, *f* opaque.

If the sacs are developed first in the ovary, as I think they would be, Loranthus becomes an instance of a nucleus excerting several embryo sacs, unless indeed the sacs pass up into the style, round its base, and so avoid perforating the cone.

Fig. VI. No cellular mass is produced before the fall of the style, and no inner tubes in the lower part or ovarial part of the sacs, no viscum.

It is difficult to examine the sacs at this period, as the central columnar tissue is tough and opaque amylaceous granules.

All the sacs at least do not reach to the fundus of the central amylaceous tissue.

The unequal extent of the sacs may perhaps give rise in some measure of the lateral apex of the funicle.

Even after this and before any visible enlargement, the sacs remain unchanged with the exception of shewing evidences of the inner tubes becoming in iodine columns of grume, without proper membrane and not extending into the dilated part of the sac.

4. *Loranthus coccineus*, Pl. DCXXVI.

Ramuli papillos. fol. alter. mediocre petiolatis, coriaceis costa excepta aveniis, fuces viridescence e basi cordati inæquilateraliter oblongo-ovata, obtusa ima apicem rotundato obconduplicatior gradatim concava.

Racemi axillares, fol. breviora spicifor. undique florigera.
Pedicelli breves, declinati alabastror. transversi vel ascendent apice subflor. 1-bracteat.

Alabastrum adpressum raceme axin infra medium 4 gonum, supra subteretes.

Perianth ad medium 4-partatum, laciniæ patentibus, an recurvis, corollam urceolatam tubum angulatum, apice angustat. simulans extus, brunneo-coccineum intus vividum coccineum, extus pilis stellatis vestit., in reality it is composed of 4 pieces, with a broad subtriangular concave base, then a narrow part (at the faux) the margins are here rugose and folded over the filament which is inserted here.

Filam cylindracea vivide coccinea perianth lacin. paullo brevius, anth. oblongæ breves adnatæ.

Calyces tubus subcylindraceous ore pallulum angustato, subintegro, omnino pilis ferrugineis stellatis squamato-furfura, stylus coccineus clavatus, stigma capitato discoid. coccineum, perianth lacin æquans.

Fruit shaped like a florence flask, nempe e basi rotundata, gradatim attenuata apice subcylindraceo, extus more calycis sed distantius furfurac.

Viscum albidum copiosum, semen erectum conico-4-gonum angulis hispidus in setus albidus longe product, basi induratum, the space between the prolongations filled with viscous resin in which the green radicle nidulates.

Albumen album carnosum confined to the indurated base, cotyledon, cylindraceus albumin $\frac{1}{2}$ brevior.

Rad. maxima sphærica exsert.

Embryo altogether green.

Obs. It is closely allied to Loranthus pentapetalus, fol. alternis e basin inæquilateraliter cordato-ovata, per obtusa coriacea evenia. Racemis axillaribus speciform, solitariis vel fasculatis, floribus 1-bracteatis pedicellas declinatus 4-meris, stylo cylindracea. Bacca e basi ovata, in collum attenuata. Semen 4 gonum, hirtum 4 setigera, indurato.

It belongs to the same group with L. oleoides, farinosus and pentapetalus, and is the same in physiology with L. bicolor, viz., sacs extended up the style, albumen developed from their anterior ends.

The inner viscum is first formed, *i. e.* that which conceals the naked radicle, while this is developing, the tissue on the lines of the perianth and its 4 horns becomes indurated, and the outer viscum becomes developed, at first between the horns and the green tissue, then extending downwards and ultimately extending all round the pericarp and its horns.

The cotyledons are 3, which is another point of affinity with Santalaceæ.

The part of the embryo first formed is, I think radicle, if so it becomes pushed upwards by the growth of the cotyledons downwards, this point is worth examining.

5. *Loranthus obovatus* Gr.

Ramulis compressis junioribus, etiam glabris, fol. opposit. breve petiolatis cuneato-obovatis, coriaceis glabris læte emarginatis, venis secondariis supra subdistinct.

Racemis exaxillis velustis, foliis brevioribus solitariis vel aggregatis, pedicellis brevibus brachiatis, decussatis apice minute 3-bracteatis.

Ovar. ovatum, ore calyculi contractiusculo minute 4-dentat.

Alabast. erecta struct. tubo subcylindraceo basi angustato, medium supra angulis 5, 6 cristatis, lamina (ob æstivat.) clavata, 5-angulata.

Flos ad anthesin ad cristis 5, 6 partit. laciniis spathulato-reflexis, basi viridibus, apicem præsertim marginibus rubris, tubo color rosaceis.

Anth. longiuscule exsertæ, filament carneis linearibus adnatis.

Stylus longitudine stamen, stigma capitat. fere sphæric. viride rubrum.

Hab. Malacca. In sylvis littorat Tangong cling.

Obs. This will belong to same section as L. globosus to which it comes close enough, it is a pretty species.

On this plant a scurrula-looking young plant had become parasitical, I mention this as it is necessary to examine the specimens to see whether they belong to one or two species.

Dicatur pro tempore Loranthus obovatus, probably it is Jack's Loranthus retusus.

6 *Loranthus leucosiphon,* Gr. Pl. DCXXIX. Fig. I.

I. Plant nat. size.

Pedunculis solitariis vel sæpius aggregatis, sed vix duobus e puncto uno exorientibus 4-6-floris apice spicatim, sursum ascendentes.

Flos unusquisque 3-bracteatis, bractea externa, (antica) oblonga obtusa concava, lateral. ovar. arcte includent, eadem fere longitudine compresso carinat.

Ovarium obturbinatum, per. minute bracteis interior duplo brevis, ore integerrimo, e limbato.

Per. tubus subclavatus, $1\frac{3}{4}$ uncialis paullo supra ovarium constrict. tunc gradatim ampliatum, demum ad faucem constrictiuscule teretiusculum, angulis obsoletis limbo bipartito reflexo laciniis ratione tubo breviusculis, linearia spoon-shaped, interdum perparia apicibus cohærent.

Color albus, limbo alabastrum plumbeo per anthesin rosaceo marginibus of spooned apex atratis.

Stam. totidem filam. subulata, sanguinolenta, antheræ terminal adnatæ.

Stylus subulatus stam. superans viridis.

Stigma capitat. viridia.

Filament (adhærent) primum tenuium demum ad constrictione base tubo in gibberem subito incrassat. fauci liberi fact.

In arbor. parasit. forming a large shrub with many dependent branches.

Ramulis compressiusculis ramis teretibus.

Foliis opposit. petiolatis e basin cordato-ovata vel ovalia obtusa integra concava glabra, venus venulisque utrinque elevatulis reticulatiuscul juniora sanguineo tincta.

Pedunculis basi bibractatis, petiolos subæquant. sæpissime exaxillis fol. lapsor. si 6-floris, florib. 2 termin. sæpius abortient.

Inflorescent irregularis at cujusque peduncula centripeta.

Fructus non vis.

Hab. Pringitt Malacca.

Allied to Elytranthe albida Bl.

Glabra, fol. oppositis petiolatis e basi cordato-ovata, ovulibus coriaceis, pedunculis aggregatis exaxillis velustis, apice 4-6 floris, floribus spicatis bracteis 3 bus amplis sursum curvato-ascendent. tubo clavato prope ovarium constrict. vix angulare reflexam 6-partito.

Shortly after the fall of the corolla which I think takes place quickly carrying with it? the style, a double long section presents the following appearances:

The cicatrix of the style is made up of browned dislocated cells, and beyond it projects to a considerable distance, slender tubes which are the boyaux.

The sacs about the middle of the section gives birth to a cellular mass, the walls of the cavity surrounding which are distinctly sphacelate.

Below this, there is a common somewhat obpyriform cavity, the margins of which are very opaque, this is filled by the convoluted prolongations of the tubes beyond the cellular mass, and below by the embryo, which is preponderately developed.

The first changes in the appearances after impregnation consist in a long section of irregular opaque lines along the course of the sacs, these lines have brownish edges, and are irregularly flexuose, transparent along the centre, where they look cellularly subdivided, then, I imagine by the disappearance of the tissue around each, coalesce into one cavity, when the appearances are such as I have described above.

It is only through about the lower ½ of the central tissue that these enlarged and irregular lines are evident, this is easily accounted for.

I believe the sacs can develope (4) oblong cells from the apex independent of fecundation.

Pl. DCXXIII. Fig. III.

Bud 2 lines long. The style presents in its lower part at least a slit-like cavity which extends below its base into the ovarium, the fundus is occupied by a conical-shaped process of mucilagino cellular tissue. Iodine at this period does not exert its particular amylaceous action on any part, but the nipple and the sides of the canal of style are more darkly fuscous than the rest.

Bud 3½ lines. The nipple is more developed. Iodine now violets in several lines, which affect also the nipple at its base, but only partially compared with the violetting along the other tissue of interior of ovary.

Violetting also takes place at the extreme base of ovarial tissue, but in a slighter degree.

The appearance of the violetting lines is such as would suggest the exsertion of several sacs ascending from the base of the nipple.

Yet I believe that this arises merely from the contiguity of the lines to this body, as the lines on dissection appear to pass by it.

Five lines long. The nipple is now very hard to free.

Iodine causes the same violetting which extends upward a little way into the style, and below has a tendency to pass beyond the base of the nipple, reaching almost if not quite but in a faint line to the basilar violetted spot.

No sacs appear to exist at this period.

The part which corresponds to the calyculus is not much fusced by iodine, but retains a greenish appearance.

The rest of the base of the flower is a homogeneous mass percursed by vascular bundles.

10¼ lines long.

Nipple scarcely if at all detectable, central tissue whitish gorged with granules, percursed by 5-6 fuscescent lines, which now reach lower down than they did before.

Iodine now violets the whole of this, most intensely however along the lines of the sacs. The base is now when iodined indistinguishable from the rest.

Sacs exist at this period, but I am ignorant how far they extend upwards.

A long section at this period, shows the slit of style not to extend to its base.

A transverse section at this period iodined shows a small central space unvioletted, around which are 6 violetted spots, towards the base of the flower confluent, above more and more distinct, they are in the direction seen to be opposite the lobes of the epigynous gland.

Towards the apex rather oblique, *a* calyculus, *b* part of base of perianth, *c* part of epigynous gland.

The lobes of this are alternate with the lobes of the other fig. towards the base, as is shewn by the situation of the bundles of vessels.

The violet dots in a bud, 3 lines long are only visible towards the epigynous gland, below, the tissue is quite homogeneous.

If it really is the case that the sacs are developed from above downwards, and that they subsequently extend below the base of the nipple, it may be considered as conclusive that the nipple is merely an elevation of the paries of the ovary, and has nothing apparently in common with an ovulum.

After repeated examinations I can make nothing out of this from the time, the nipple appears to become adherent. The style separates at the point where the open canal terminates; here it seems to be solid.

At expansion, the ovary may I think be described as solid containing 5 or 6, gut-like embryo sacs, imbedded in the

central tissue, this is particularly the case, on a transverse section, at this period I can find no traces of the nipple.

In no stage have I seen any thing like the prolongation from the nipple of Loranthus bicolor.

The appearance of the nipple in its earlier stages are similar to the placenta of Santalum Osyris so as to point out the probability of its being a similar organ.

The same Loranthus leucosiphon, Gr. Pl. DCXXII.

1*a*. Lateral bractes entirely enclosing young flower.
b. Calyculus.
c. Perianth.
d. Stamen.
e. Pistillum.
f. Its cavity.

The pistillum is at this period greenish, the stigmatiferous portion of the style exceeds a good deal the remainder, and is even now celluloso-papulose. The canal of the style extends throughout its length, and terminates below in a triangular small cavity with a flattish fundus, which is on a line with the line of attachment of the perianth and the stamina.

The whole cavity of the pistillum is rendered opaque by air.

It is evident that at this period the whole pistillum is superior, even with regard to the perianth and stamina, but much more so with regard to the calyculus, the line of whose attachment is to be perhaps considered a line, midway between the exsertion of its inner and outer surfaces.

2. Double long section of ovarium etc. 5 lines long.
a. Calyculus.
b. Perianth segments, now inconduplicate.
c. Canal of the style, the lower line points to its termination, I think from adhesion.
d. The closed up part of the same, the lower line marks out its termination.

e. The part now violetted by Iodine, there is perhaps a tendency to less action along the centre, as at *ff*.

At this period there is nothing satisfactory detectable of the nipple, although I have seen appearances as if it had become elongated, the apex of the neck, reaching to the point where the canal of the style appears to become closed.

3. Double transverse section of the same.

The calyculus is distinctly marked out, underneath its cutis is a black line of opaque tissue to which succeeds a double row of rather large transversely arranged cells.

a. Calyculus.

b. A thick layer of dense tissue greenish in its natural state.

c. Sub hexangular in outline.

c, d, b. Vascular fascicles surrounded as usual by uncolored fibrous tissue.

e. Greenish tissue occupying the greater part of the inner circle.

f. Vascular fascicles of the ovarium itself.

g. Six ovate opaque spots which I take to represent the situation of the sacs, and which are violetted by iodine in a confluent manner as pointed out by the blue lines.

h. A central cellular spot.

4. Double long section of flower bud, 4¼ lines long.

Iodine at this period violets in several lines from up the style to the base of the nipple.

This body is not so purely violetted as are the lines.

Appearance of a tubular neck to the nipple.

a. Calyculus of two layers.

b. Perianth.

c. Extent of the white dense tissue of the interior of the base of flower.

d. Nipple-shaped process.

e. Canal of style.

f. Green tissue of the base of the flower.

5. Double long section of base of flower bud 3¼ long.

Nipple evidently belongs to the white tissue of the base. Hypothesis, that the sacs are developed from the placental tissue lining the cavity of the interior.

The same figures have the same references.

Iodine at this period violets along the usual lines, which are adversely clavate, violetting not so pronounced as in 4.

6. Just before expansion of flower.

In this no trace whatever of the nipple was seen, all the dark colored part is homogeneous, and crowded with granules of amylum.

a. Calyculus of two layers.

b. Perianth.

c. Outer boundary of central white tissue, which at *e*, (*i*, *e*, the space inside *d*, *d*, two vascular bundles) is opaque from being crowded with amylaceous granules.

f, *f*, *f*. Three embryo sacs, having the same extensions as in L. globosus.

g. Canal of the style.

Twelve lines long appearance as if the bases of the styles canal was blocked up by a mammillar process, continuous with that part of the central tissue that is violetted by iodine.

7. Double long section of base of a flower-bud 3¼ lines long.

a. Calyculus.

b. Perianth.

c. Filament, which by its adhesion to the perianth causes the keeled appearance.

d. Central white tissue with its central nipple.

e. Canal of style, ending below in a triangular space occupied by the nipple.

Proper sequence of the sketches to be.

1—4—7—5—2—3—6

1 2 3 4 5 5*a* 6

The same Pl. DCXXIII. Fig. I.

1. Double long section of ovarium after fall of perianth and style from the cicatrix of which filaments are seen to project.
   a. White tissue of centre.
   b. 3 embryo sacs.
   c. Young albuminous growth from one of those.
   d. Another ditto much less advanced.
   e. Convoluted funicle embryo.
   f. Embryo.
   g. Vascular supplies.

1 *b*. Represents *no*. c. of the same, but the filaments were not seen to traverse the albumen, at *a* is the end of the embryo sac? at which the tubes emerge, their cells are of large diameter and lax, at *b* another funicle adhered to this, forming with this the embryo.

1 *a*. Represents *d* of 1. The young albumen is 4-angular from pressure, each cell is crowded with grume and contains a grumous nucleus, this did not reach much more than $\frac{1}{2}$ down the cavity of ovarium. There was a tendency to grumous aggregation towards the bottom of the cellular part of the sac, *a* is the termination of the sac reaching to the apex of which are two tubes, which pressure did not shew in the albumen.

2. From another less advanced ovarium the sac was nearly cellular throughout the lower $\frac{2}{3}$, lowest cells being most developed, and the upper ones with faint walls and no nucleus, the tubes are enclosed *throughout*, but the sac ceased to be cellular.

The same Pl. DCXXIII. Fig. II.

Represents the united embryo of the same.

The inner tubes remain two, either to the end of the irregular edged sheath or near it, where this ceases they ap-

pear as three, they continue to do so till they unite and perhaps even after this. The cells of the sac are most developed, about the middle of the cellular part, they are not formed from the inner surface of the wall itself, but between this and the inner tubes, no nuclei were visible.

Above the cellular part of the perfect sac, are nucellar aggregations and in the same there is alike tendency below, no cells developed in the sheath.

The inner tubes are articulate towards the apex of the cellular part, and probably also once or twice in this part.

The same Pl. DCXXI. Fig. I.

1. Double long section after the fall of the corolla and style, no fecundation having taken place shews that the sacs reach to the bottom of the central dense tissue.

1 *a*. Upper part of sac of same 1-10.

1 *a*. Lower ditto.

b. Upper part of ditto 1-250.

2. Sac from an ovarium after fall, no fecundation, these sacs had become inflated, their lines of direction being conspicuous, they reach to the bottom of the central tissue.

3. Is the lower portion of sac, about the same period shewing a tendency to independent cellularity.

4. Double long section after the fall, fecundation has occurred, as is evident from the boyaux protruding from cicatrix of style.

4 *a*. Represents the lower part of fecundated ovulum of the same, the left hand one, at *a*, is the termination of the sac.

The same Pl. DCXXI. Fig. II.

Long double section of L. leucosiphon just after the fall of the corolla and style.

The lower $\frac{1}{2}$ of ovarium presents a large sub-irregular cavi-

ty occupied by the embryos, and their contorted funicles, of the four, 2 are united into one, 2 remain separate.

2. Represents an entire (independent) sac, embryo and funicle. The sac towards the cellular part contained much grumous matter, above it was nearly empty, here and there were amylaceous granules. Each cell of the cellular part is crowded with grume and containing one nucleus.

In the upper part of the attenuated part a few cells without nuclei were present, but towards the terminatinn of the sheath which is at *a*, no cell had been developed.

Beyond this the continuing tubes were increased in size, the two first joints, presented 3, the terminal one several, at its apex was the commencement of the collet.

7. *Loranthus involucratus.*

Caule elongato lenticellato, plumbeo, fol. ovalia acuminata carnosa, subintegra venis subtus præsertim primaria secondarisque inferioribus rubescent, flores capitati. C. breviter-pedunculati axillares nec ne etiam infra axillares, involucro 4-phyllo cincte.

Foliola involucra lanceolata plus minus rubro-colorata pube brevissime velutina. Pedicelli brevissimi his oppositi et adnati, pubescenti.

Calyx dense pubescente tomentosus 5-dentat.

Corolla tubulosa, extus pubescens in laciniis 5 spathulatis reflexis partita, viridescens laciniis castaneo-rubris.

Antheræ erectæ adnatæ filamentis tubum corollæ paullo excedentibus, coccineæ. Stigma capitat. coccineum, antheras paullo superans.

Ovarium ut in ordine, ante fecundat. ex ovulatum.

Capitula aggregato numero vario, cujusque evolutio etiam varia.

Hab. Assam. Versus Kuchabat : *March* 5*th*, 1836.

This species certainly corroborates Mr. Brown's idea of the affinity of Loranthaceæ with Proteaceæ, an opinion which is

borne out by several facts, I should consider this an approach to Lambertia.

An L. involucratus Roxb. Fl. Ind. (ed. 1832,) 2,188.

Modecopsis.

Modecopsis vaga, Pl. DCXXVIII.

Frutex scandens, foliis estipulatis, ovato-oblongis basi subcordatis breve acuminatis subtus glaucis integris e glandulosis petiolis utrinque incrassatis, basi haud articulatis, cirrhi axillares apice spiraliter torti sæpius simplices raro bifida (pedunculi abortivi) sursum incrassati.

Fructus solitarii vix semper in pedunculo folio breviore apice varia diviso, reliquis floribus vel fructibus nempe decessis, ovato in stipitem fructu, $\frac{1}{3}$ breviorem attenuatis, sicca, subdrupacea, infer. apice quasi truncato ibidemque dentibus calycinis brevissimis abbreviatis 5-coronat. Alveola medio toro depresso obsolete 5-gono notata, angulis dentibus calycinis alternantibus et cicatrice parva staminum? notatis medio stigmatum 3 reliquias gerente.

Calycis parietis omnino adnata pericarpio demum baccata, viridescentis, secus lineam junctionis cum pericarpio rubescentes.

Pericarp. vel epicarp. carnoso-corneum ambitu azurescens cæterum albidum.

Mesocarpium fere osseum, pallide brunescens, intus endocarpio albo subspongioso hinc ellinc fisso vestitum. Semen unicum maximum ovatum pendulum inferne acutum supra latius, obtusumque. Tegument hinc adhærens nullum, an ideo endocarp. spongioso-cellulosum ad testam referendum.

Semen carnosum densem distinctione partium nulla, nisi forsan radiculæ, (cui forme umbonis depressa a quo affixum est semen) medio basi usque ad media linea lutescente pilosa cellulosa notatum.

Calyx demum e pericarpio secedens, bivalvis, valvis reflexis interdum bipartitis.

Hab. In sylvis Noadwar examinavi semina ? tantum, *Feb.* 17*th*, 1836.

Habitus omnino Modecca, calyx recessus ultimo in laciniis lobosve 5, sepalis respondentibus fissus.

Viscum.

1. *Viscum aphyllum*, Pl. DCXXX.

Caulis basi simplex, subrotundus, tunc rotundato anceps, ramis complanatis tetragono-ancipitibus, ramulis complanatis sub 5-striatis, stria media majora.

Length and proportions are very variable.

Floribus monoicis sessilibus ad articulos sæpius ternis sæpiusque fæminea, unica centrali duobus lateralibus (scroti nis) masculis.

Bractea cupuliformis ore emarginat. ovarii tubum ovatum $\frac{1}{2}$ recondit.

Flos fæ : minutus tubo ovato perianthio suberecto, sepalis cordatis.

Stylus sub 0, stigma magnum discoideo-convexum.

Saculus embryon. 1, ante fecundation : imperforat. simplex.

Bacca pisiformis lutescens glabra, demum albida, basin bracteu persist. suffult.

Semen erectum visco obtectum, pericarpium obcordato-oblongam compressam cornubus maturis obsoletis, virida basi lineis venoideis albis (pericarp. ven.) albumen $\frac{1}{2}$ nudum virida.

Embryo peripherieus, infra medium, radicle pointed out by a greener spot, on one of the compressed edges.

Fl. masculi sæpius ut videtur 3, sepali-sepalis erecto-patentibus apice reflexis, bracteatis ut fæmine.

Plant of a lively yellow green.

The branches become rounded by age, but the joints are

always swollen, still the anceps edge is always traceable, the branchlets are slightly spiral twisted, the direction of the broad and narrow faces of the joints alternates.

The perfect females are much more numerous at a given time, than the males, fecundation is very common.

The real state of the inflorescence is a ternary flowered spike, but often on either side of a solitary, (terminal female) there is a female and two males, or there are 3 ternary spikes aggregated. The females are by no means always central, particularly in the central spike of a thrice ternary one.

The phenomena are as in Viscum papulosum, it is vain to attempt to determine the species by books, the characters given entirely omitting the seed.

Pl. DCXXX. Fig. 15, represents the parasitism of the specimen, which is a simple conical graft, without intermixture of any system.

The two barks adhered slightly, there is no pith in the parasite, probably from excertion, or where does the pith begin.

Pl. DCXXX.

1. Plant natural size, joints rather too broad.
2. Portion of a branch slightly magnified.
3. A flower-bearing joint.
4. Double transverse section of anther.
5. Pollen (in water.)
6. Female flower with the two males developing laterally.
7. The same, two sepals removed.
8. Double long section of ovarium of same period, *a* the the embryo sac visible in its axis.

8*a*. Embryo sac detached.

9. Embryo sac after fecundation, M. $\frac{1}{2}\frac{1}{5}$ a pollinia visicle.

9*a*. Do. $\frac{1}{5}\frac{1}{0}$, the apex of the sac with a distinct interruption of continuity.

10. Young fruit about $\frac{1}{2}$ advanced.

11. Ripe fruit.
12. Long section to expose the seed.
13. Seed detached, the vein-like marks are what I take to be the remains of the true pericarp, or endocarp, which in fig. 10, are seen to extend above the young seed.
14. Long section of seed, through its large diameter, the appearance of a tegument is due I think to a peculiar disposition of the superficial cells of the albumen, which is, except towards its base, naked.

Hab. Malacca.

2. *Viscum* sp. Pl. DCXXXII.

1. Male flower before expansion.
2. Do. after expansion.
3. Do. sepals partly removed.
4. Anther and its sepal.
5. Front view of stamen.
6. Back view of do.
7. Lateral do.
8. Section of anther (unsatisfactory.)
9. Apex of branch with two female flowers.
10. Long section of female flower before expansiou, no cavity visible in the ovary.
11. Do. more advanced, cavity visible and occupied by the embryonary sac.

11*a*. Embryonary sac enlarged.

12, 12*a*. Similar sections, but taken at a more advanced stage. The tissue immediately around the sac is lax transparent, *a* represents the commencement of that which subsequently becomes the coriaceous tegument, *b* of the viscous tissue.

13. Female flower after the fall of the perianth.

13*a*. Section of do., the same letters have the same references.

13*b*. Embryonary sac now rendered opaque by albumen.

14. Long section at a more advanced period, letters refer as before.

15. Do. more advanced.
17. Same more advanced. Embryo just commenced.
18. A good deal more advanced.

HAB. Tongsa iu Bootan.

Viscum, monoicum Pl. DCXXXI.

Bacca pisiformibus circa apicem areoli cicatricis sepalorum, imo apice reliquias styli et stigmat gerent, in pedicello brevi robusto basi 1-bracteato, fere læve. Accedit. materies crassa gelatinosa dehiscens.

Viscum tenuissimum hyalinum circa semen.

Semen subobcordatum compressum erectum viride basi album. e qua ascendent. fili (venæ ?) albæ incompleti, one of them hinc utrinque apicem versus in sitam product. One of the smaller sides hinc, mammilla pointing out the apex of root notat.

Albumen copiosum carnosum viride. Embryo transversus leviter curvatus. Radicula longissima peripherius. Cotyledones incumbentes carnosæ foliaceæ discretæ.

The white vein-like threads are the remains of the true pericarp, which in other species is much more developed, complete and persistent. It is difficult to ascertain the situation of the faces of the seed as it is so easily disturbed by pressure.

Attachment simple, plant pendulo glabra ramulis (et folia) oppositis flexuosis sulcato-angulatis.

Fol. opposita basi in petiola brevissima attenuata ovato vel lanceolato-oblonga inæquilateral sæpe falcata e subundulata concava basi 3-venia, venis supra prominulis obtusa coriacea, brittle.

Flores minuti in glomerulis axillarib. inserti, sæpius e ternis, aliquando e binis, aggregat.

Masculi et fæminei in eodem glomerulo, fæm. ut plurim. numerosiores.

Flores basi bracteæ cupuliform. bidentato cinti vel solitarii

(ob abortu) vel uno duove laterali scrotino sæpius masculis ovarium ovato-globosum post laps. sepal. apice areolat. Sepala dentiforme æstiv. valvata.

Stylus conicus, stigma capitatum. Fructus, juniores pyriformes papulosis maturi læviusculi papulis in carne quasi immersis punctulatis pisiformibus.

The gelatinous stuff is of late development, when the seed is half developed it will be found enclosed in gelatinous viscum, which has much the appearance of the mature gelatine. But when almost ripe, the seed will be found slightly surrounded with viscum, and almost in opposition with the epicarpium as it may be called.

Fl. masc. alabastro subrotundatus, ad medium usque 4-fida, sepalis fæmin conformibus.

Anth. 4, sepalis opposit. his insertæ, oblongæ anterior face with a number of alveola bearing white pollen.

It agrees tolerably well with character of V. falcatum, but there is no judging from mere habit and inflorescence, the fruit of this is so peculiar as to constitute the plant a subgenus.

V. monoicum ramis (foliisque) oppositis glabris sulcato-angulatis, fol. subsessilibus oblongis sæpe falcatis inæquilater basi 3-junioribus 5-veniis venis subtus indistinctis, coriaceo brittle, obtusis.

Glomerulis axillaribus, densifloris, floribus sessilibus basi bracteatis circumcinctis, solitariis binatis vel ternatis.

The inflorescence is excessively compound, the bilobed bractea represents the bracteola of a trichotomous triflorous, peduncle, as it often is, the evolution of the flower is very anisochronis.

1. Plant natural size.
2. Male flower bud.
3. Male flower, cut through longitudinally, 1 sepal removed.
4. Sepal and anther.
5. Transverse section of bud of male.

6. Transverse do. of anther after dehiscence.
7, 8. Pollen.
9. Female flowers.
9*a*. Ripe fruit.
10. Same cut away to shew the seed.
11. Long section of fruit (not ripe.)
12. Do. same more advanced.
13, 13, 13. Different views of seed, and endocarp.
14. Long section of seed not quite mature.
15. Do. of mature seed.

SCHŒPFIA.

Schœpfia sp. Pl. DCXXIX.

Arbor. mediocris, ramulis subnutantibus elongatis rubro-tinctis sæpe fasciculatis vel aggregatis. Foliis alternis exstipulat. Petiolis brevibus dilatatis $\frac{1}{2}$ tortis lamina lanceolata vel lanceolato-ovata acuminata integra tenera carnosiuscule basi subtrivenia venis secondariis distinctis arcuatis, cæteris reticulatis.

Spicis axillaribus, solitariis pendulis folia æquantibus ves excedentibus plurifloris, compressis, bracteis minutissimie squamiformib. Flores cream-colored, tinged with purple fragrant.

Perianth. superum, cylindraceum 4-5 partit. laciniis æstivatione valvatis demum revolutis margine minute puberulis.

Stam. 5, sepalis opposita, laciniar. basibus inserta. Filament. (liber) breviss. filiforma. Anth. biloculares, terminates, longitud. dehiscent. Pollen album glaberrimum subtrigonum, triplicat.

Ovarium inferum omnino, apicem versus annulatum situ insertionis. Perianthium disco magno carnoso integro luteo-coronat. subangulata.

Stylus filiformis, stigmato ovato 3-revoluta papillosa inclusa. Ov. apice unilocularis, inferne trilocular, loculis 1-ovulatis.

Placenta apice libera conica ovula ferens, ovula ad nuclei redacta, extus convexa intus plana, mere cellulosa, et omnino simplicia, fasciculus pilor. simplicium alborum, pone stamen quodque.

Tubus perianth gibberibus totidem obsoletis quot laciniis et his alternantibus.

This is I believe Schæpfia.

It is a very curious genus, evidently uniting Olacineæ, Santalaceæ and Loranthaeeæ, but more akin to the former than to either of the others.

Obs. The calyx is reduced to a mere ring and is evidently the transition from that of Loranthaceæ.

With Santalaceæ it agrees, in opposition of the stamina, the valvation of the perianth, the structure of the placenta and in the ovula, which are reduced to the nucleus.

With Olacineæ in habit, structure of the ovarium, and valvation of corolla.

With Loranthaceæ in the valvate perianth, opposition of stamens and in the inferior calyx.

It is curious that in these orders, in which the calyx is rudimentary, the corolla is much developed, and vice versa, of which Santalaceæ are a notable example.

1. Alabast just before expansion.
2. Flower.
3. Do. vertically.
4. Corolla longit. spread open.
5. One of its laciniæ, stamen deflexed shewing the fascicle of hairs.
6. Back view of stamen, 6*a* inner or front do., 6*b* lateral do.
7. Pollen. 7*a* do. immersed in water.
8. Hair from the fascicles behind the stamina.
9. Pistillum.
10. Stigmata and upper part of style.
11. Ovary transverse section below the middle. 11*a* do. towards the apex.

12. Do. longit section.
13. Do. so as to shew the peculiarity of the placenta, and the cells in which the lower parts of the ovula are contained.
14. Ovulum, inner face of. 14*a* same viewed laterally.
15. Apex of the ovulum shewing it to be simple and hence nucleary.

Hab. Bootan Itinerary Notes, p. *no.* 876.

GRANATEÆ.

Punica.

Remarks on Pl. DCXXXIV.

Punica was I believe first separated from Myrtacea by Don, whose views have been adopted by D C., subsequently Mr. Lindley replaced it among Myrtacea, and has given a new and ingenious theory as to the structure of the fruit, which he supposes to be formed of many carpella, placed in two rows instead of one, the other irregularities being due to adhesion of the placentæ with the bark and front of the cells. It may in the first place be doubted whether the mere fact of plurality of carpella would not be sufficient to indicate Punica to be distinct from Myrtaceæ in all Indian species of which the ovaria is bicarpellary. There can be no doubt that Lindley is right in asserting that Punica has a plurality of carpella, but I am disposed to doubt the fact of their being arranged in two rows.

The plurality of composition is indicated inter alia by the number of vascular fascicles of the style, as well as by the sinuosities visible in the upper portion of the stigmatic canal, to which the fascicles are always opposed, which sinuosities always correspond to the number of stigmata, with this number, which varies from 5 to 8, the cells of the ovarium,

as seen on a transverse section carried through the upper portion have a marked correspondence, and in cases where one is deficient, one of the septa is much increased in size, indicating it may be fairly inferred an obliteration of the cavity, the number agreeing with the upper tier of cells. It seems to follow, owing to the greater permanence of the style or stigma than of the ovarial cavity itself, that no other carpella enter into the formation of the fruit, and hence the idea of an inner or lower series is untenable. Of the greater permanence of the styles or stigmata over the cavity of the carpellary leaf itself ample proofs exist in Compositæ Gramineæ Plumbagineæ, and Cupuliferæ ?

It need not therefore be insisted on, it may be sufficient to state, that if Mr. Lindley's view be correct, there must be the same number of stigmata as there are cells. This I do not find to be the case, my idea is this. The ovarium is formed of from 5 to 8 cells, which towards the base of the fruit become much distorted by various growths of the placentæ, and it is possible that a sort of dislocation adds to the confusion, that the number of cells can only be ascertained by a transverse section carried through the upper portion of the ovarium.

The placentæ are various in the situation of the upper cells, they are always parietal, of the lower both axile, fundamental and parietal. It is a general rule that towards its apex the pistilla when compound has a tendency to revert to its utmost possible simplicity of structure.

The situation of the placentæ of the upper cells is alone, a great objection to Mr. Lindley's view, since the placental suture would, allowing it to be true, be turned away from, and not towards the axis, an anomaly quite unheard of.

In my view the irregularity is due to cohesion, and is not opposed to any well known law.

In very young ovaria before the appearance of the ovula, the cells are distinctly marked out, and they are evidently

visible at a somewhat later period, when the ovula have just commenced to appear.

The affinities remain to be pointed out. These are most marked with Soneratia and with Leptospartion Lagerstroemia grandiflora of Roxburgh. These three genera form a group uniting Lythrarieæ with Myrtaceæ, which group is at once known by its valvate calyx. They all agree in this, in the structure of the petals, and ovaria, and in habit.

They differ from Myrtaceæ in almost every point, but the adhesion of the calyx with the ovarium.

No pellucid dots exist in Punica, neither are there any traces of their existence, the pellucid portions which do exist are not of a glandular nature, and appear to depend on obliteration of green parenchyma taking place irregularly, I find however that in many instances, pellucid markings do exist, but they are unaccompanied with any aroma. There is a tendency towards an intromarginal vein, but to this I attach little importance.

In habit and especially in the shortness of the branchlets, there is much analogy with Pomaceæ, as likewise in the tendency to become spinous. Compare this with Mespilus japonia.

With Lythrariea they have most points in common agreeing with them, especially in the valvation of the calyx, the structure of the petals and ovula, differing essentially in the union of the calyx with the ovarium, or in the inferior fruit.

With Myrtacea they agree in opposite leaves without stipulæ, in the inferior fruit, differing in the valvation of the calyx, the nature of the petals, stamina, and plura carpellisation of the ovarium.

Punica agrees with Memecylon in the convolute cotyledons, and among Lythrarieæ above all others with Grislea, the coloration of the flowers being in both the same, and so far as the calyx is concerned of an unusual nature.

What I have said about the greater permanence of the stigmata over the lamina of the carpellary leaf is on

reconsideration untenable, because the stigmata being in my opinion obviously continuations of the placentiferous margins of a carpellary leaf, it cannot subsist without the other. Besides the two fascicles of vessels of composite ovaria prove, that its formation is binary, and hence in Polygoneæ and Plumbagineæ, there should be an equivalent number.

It may fairly be stated, that the least permanent part of an ovarial leaf is the inflected margins. This subject is ill understood and can only be cleared up by extensive examination of very young ovaria. I think I have observed in Naias, that the ovarium is formed after the ovulum, for in a very early period, the papilla of this will be found ½ enclosed and surrounded by two scales the coalition of which forms the ovarium.

The situation of the stamina in Punica is unusual and suggests curious reflections. Something like it occurs in Barclaya. The usual situation of stamina is above the petals or at any rate nearly on the same plane, and in those cases in which the stamina are indefinite the inner ones are generally above the outer. In Punica the reverse is the case, the outer are indeed on the same plane as the petals, but the rest are below these, and the innermost are so in an unprecedented degree. It is curious that such an arrangement does not occur in those cases of perigynism in which the ovary is entirely free, and the tube of the calyx is lined with a glandular lining of which the stamina are evidently the continuation.

The obliteration of various parts of vegetable tissues is well worthy of study, it is the exposition of such that will settle the question whether in inferior flowers, the ovary is united to the calyx or to an excavated torus, (*Rosa etc.*).

The inferiority of a fruit is as capable of being explained by one supposition as by the other, but if obliteration be a rare phenomenon in vegetables, we shall be authorised in adopting the latter, since the existence of the different lay-

ers that otherwise should exist, seems to be by no means frequent.

Two layers ought to exist at any rate, if the inferiority be ascribable to adhesion of the calyx with the ovary, the outer would be referrible to the calyx, the inner to the torus, from which the petals and stamina are growths.

The instance Punica is precisely the reverse of that of Nelumbium, in which there is such an enormous growth of disc, without the production of any stamina above the general level.

Pl. DCXXXIV.

1. Calyx before opening shewing its valvation, 1*a* do. vertical view.
2. Flower, 2*a* do. long section.
3. Stamen before maturing, inner view, 3*a* do. outer or back view.
4. Perfect stamen front, *a* back, *b* lateral, the anthers are curious, and differ from most others in the nearly globular connectivum.
5. Pollen, 5*a* do. immersed.
6. Stigma viewed from underneath and vertically, the lobes seen on the face of the stigmatic canal *a* are opposite to the carpella, each has a vascular fascicle, and each becomes a stigma, although this cannot be demonstrated in the state of maturity.
7. Transverse section of style, shewing that it has several vascular fascicles, each of which belongs to a distinct carpellum.
8. Stigma of a very young bud.
9. Ovary transverse section of, near the base, where all regularity has ceased.

9*a*. The same towards the apex, the number of cells generally correspond to the number of stigmata.

10. Ovula, 10*a* do. longit section.

11. Longit section of bud 1½ lines long, calyx well developed. Petals squamiform, evascular. Anthers nearly sessile, ovuliform. Stigmata distinct and separable.

11*a*. Petal. 11*b*. Stamina. 11*c*. transverse of ovary, white triangular spots represent the placentæ.

12. Transverse of ovary a little more advanced, still no regularity, *a* placentæ, *b* septa, *c* spaces afterwards occupied by ovula.

13. From an alabastrum 2½ lines long, *a* placenta portion of young ovula, *b* stamen, *c* the same submitted to pressure contains nothing but the grumous formative mass which appears marked out.

14. Alabast. 4½ lines long, *a* stamen, *b* do. subjected to pressure, outlines of formative mass visible and this is separable by pressure, *c* grumous formative mass, *d* ovulum much enlarged, but with no annuli.

15. Bud 6½ lines long, a long section of anther one cell empty, the other filled with the grumous mass, *b* portion of this $\frac{1}{20}$ cells towards the peripheris commencing to be distinct, *c* ovule, it has already commenced to turn on its axis, the annuli are distinct, *d* same under pressure shewing that there is no distinction of coats as yet.

16. Bud, 8-8½ lines long, *a* portion of formative mass, cells now distinct and easily separable. They are curiously marked and occasionally look as if ternarily divided, but this may arise from the development of the longitudinal folds, *b* two cells separated $\frac{1}{20}$ *c*, *c*, *c* ovula, *d* same submitted to pressure, shewing that the coats have been developed by the growth of the annuli.

The actual period of separation of the cells of pollen from the parent cell remains to be proved or rather shewn.

In conclusion the structure of the ovaria of this genus is very curious, but is explainable on other grounds than those adopted by Dr. Lindley.

The base of the ovarium of this genus, (from which part ideas of true structure are alone to be deduced) is bilocular, the cells containing an indefinite number of ovula, which are attached both to the axis, and to the bases of the cells, as well as to the lowermost parts of their outer parietes. Thus far it does not depart from the character of the order, which is essentially completely bicarpellary. Above these two cells are arranged in a cruciate manner, four others, which are accupied by thick parietal placentæ, on which the ovula are arranged, these looking outwards. The above number however would not appear to be constant, but if the bottom be always bilocular it is quite enough.

The explanation I consider to be obvious and totally different from that given by Dr. Lindley. For we have first in the bottom ovary the normal dicarpellary structure, and in addition a tendency in excess? towards parietal placentation, and the anomalies of the ovary arise first from the continuing inwards of the parietal placentæ to the axis, which part is also ovuliferous at the base, and second from growths inwards to the axis from the inner face of the ovary, by whlch the spurious cells are produced.

In favour of this view Apteuxis is to be adduced, a Melastomaceous genus in which the ovary is four celled, and the ovula attached to the outer walls of the lower half of each cell, and Careya, in which the placentæ are parietal. And in addition the structure of the stigma and style, which is obviously dicarpellary.

Lindley's view is wrong, bécause in all cases there is a correspondence between the number of styles and the cells of the fruit, when such arise from different carpella. The styles and stigmata being more permanent organs than the ovary! as in Compositæ Gramineæ etc. And because according to this view the placental sutures of each carpellum are not situated next the axis. The instance cited by Lindley of the permanent variety of apple is decisive of

the former law, and completely destroys his idea, unless it can be proved that the style is composed of more than two.

This genus is I think clearly not referrable to Myrtaceæ; with which order it does not at all agree in habit: in which it resembles much more certain Pomaceæ, as well as in the colour of its flowers, particularly if attention to its short lateral branches, with respect to the assertion that Punica has distinct traces of pellucid dots in its leaves, it must be urged that as there is no tendency towards aroma in the plant, so there is no reason why they should be supposed to exist, and in addition the apparent traces that may perhaps exist do not agree in nature with these reservoirs, but are rather attributable to the suppression of green Parenchyma here and there, a circumstance of sufficiently common occurrence.

As to its proper station, I am by no means determined, probably it should be placed between Melastomaceæ, Lythrarieæ, and Myrtaceæ, with this latter it has affinity with Soneratia, if Soneratia belongs to the order, with Lythrarieæ through Lagerstrœmia grandiflora and Grislea, with Melastomaceæ through Memecylon.

With Pomaceæ in habit, venation, and anthers, and granting Lindley's views to be correct in carpellation.

Examine, style its vasc. fascicles correspondence of upper cells with those of the lower, &c.

MYRTACEÆ.

Tristanea.

Tristanieæ facie.

Fruticosa, subglabra, 8 pedalis. Ramuli velutini compressi. Folia alterna oblongo-lanceolata, in petiolum attenuata obtusa integra coriacea subglabra, pellucido-punctata venis intromarginalibus et marginibus diaphanis.

Flores cymosi parvi lutescentes, cymi axillares, dichotomi velutino foliis multo breviores. Bracteæ lineares ad basin cujusque pedicelli.

Cal. semi superus, tubo turbinato limbo 5-dentato, dentibus ovatis obtusis sinubus latis.

Pet 5 rotundata, sinuata, lucidua, sinubus calycinis inserta.

Stam. 5-delpha, adelpho quoque ˙petalis opposito, et ad ejus basin inserta. Filamenta libera facta, filiformia, ante anthesin inflexa, pauca. Anth. ovatæ bilocul. longitud. dehiscentis.

Stylus brevis, stigma capitatum ovarium semi inferum, piloso sericeum, 3-loculare, loculis pluriovulatis ovula pendula radicula prope hilum.

Odor. florum stercorarius, foliorum contusorum fragrans, charactere Tristania accedere videtur.

Hab. In collibus : *Moulmein, Jan.* 1834.

2. *Tristania conferta.*

Arbuscula, fol. ad apices ramor. conferta, lanceolata utrinque attenuata, coriacea, subintegra pellucida punctata. Gemmæ terminales squamis membranaceis imbricatæ. Cymis subaxillarib. paucifloris, trichotomis, floribus majusculis albis.

Cal. tubus turbinatus, limbus 5-partit. laciniis ovatis, subulato-acuminatis demum ad apicem ovarii circumscissus.

Pet. 5 fauce inserta, rotundata. Phalanges stamen 5 polyandræ, petalis oppositæ ! filam capillaria ˙petalis subæqualia. Anth. versatilis bilocul.

Ovar. 3-loculare, multiovulat. stylus filiforme staminibus brevior. Stigma capitat.

Capsula vix exserta, margine calycis integra annulato, 3-valvis apicem versus, valvis medio septiferis, semina angulata.

Mergui : *Jan.* 1835.

3. *Tristaniæ affinis*, Gr. Pl. DCXXXVI. Fig. III.

Arborea, ramis pendentibus, foliis alternis suboppositis lanceolato-obovatis sessilibus obtusis, penninerviis coriaceis subrepandis subtus rubro-maculatis impunctatis floribus cymosis numerosiss. subsessilibus odore stercoracio, cymis densis dichotomis. Petalis albis.

Cal. tubo brevi intus pilosus limbo, 5-dentato, dentum sinubus latis.

Pet. 5 minima sinubus inserto.

Stam. polyadelpha adelphis 5-petalis oppositis! Filamentis 6-10 in quoque adelpho basibus cohærentibus pubescente superne libris factis glabris filiformib. inæqualib. Anther bilocul. ovatæ longit. dehiscent.

Stylus subulat. exsertus. Stigma subcapitat. ovarium inferum pilosus, 3-loculare, loculis 00 ovulatis, ovulis compressis ab apicib. loculorum pendulis foramen hilum prope.

a. Long section of ovarium.

b. Ovula attached to placenta.

c. Transverse of ovarium.

d. Ovula seed from its attachment.

Hab. Mergue. Ad littoram Madamaca: *Aug*. 1834. A Tristania differt seminibus alatis.

Sonneratia.

1. *Sonneratia apetala*.

Arbor. elegans mediocris ramulis pendentibus tumidis articulatis foliis oblongo-lanceolatis breve petiolatis obtusis integris, utrinque canescentibus paginis ambibus nempe stomatosis, margine cartilagineo, venis primariæ excepta indistinctis, invenula intromarginal arcuatum nexis, coriaceis.

Petiolis in ramuli articulat. basi superne excavatis. Pedunculi axillares et terminatis, sæpius triflora. Pedicelli longitudine varii inter lineam et unciam teretiusculi vel obtuse 4-gona. Flos in pedicella apice dilatato articulat.

Alabast. turbinat. calyx, carnoso-coriaceus tubo turbinato, ultra media 4-partitus laciniis oblongis patentiusculis æstivat. exacte valvatis.

Pet 0. Stamen numerosiss. æstivatione introflexa, e margine disci tubum vestientis exserta, subtus erialia.

Filamenta longiuscule subulata. Antheræ oblongæ basi affixæ biloculares longit. dehiscent. Pollen globosum.

Ovaria omnino liberum torus spongiosus crasso insidens depressum.

Stylus longus inæstivat. introflexis cito fructus demum e basi labens. Stigma maximum patenta fungiforme, æstivat. staminibus supra inflexis equitans superficies superior rugosule medium infra 4, 5 loculares margine tantum stigmatico e partibus 4-sepalis oppositis uniloculare vel basi loculis tot quot septis apice conico ductu stigmatis tantum forato.

Ovula 00 oblonga sub acinaciformia, foramine hilum versus tegument bina interiis tenue. Pl. DCXXXVI. Fig. IV.

Odor alabast apertor fragrant.

This plant differs from the other Sonneratiæ in being apetalus, and in the maximum dilatation of the stigma, and perhaps in the structure of the seed.

Both it and Sonneratiæ veræ have a peculiar aspect dependent upon the stomata being present on both sides of the leaves, but in Duabanga, they are confined to the lower side.

On what account the genus was placed among Myrtaceæ is difficult to conceive, that order being extremely well defined, and presenting no approach to such a structure of the calyx, and freedom of ovary.

If Sonneratia belongs to any order hitherto characterised, it is to Lythrarieæ, and I am at present inclined to place it there. In this case the section will come near Lagerstrœmia.

Fabricia can scarcely be Myrtaceous.

The continuation of the ovary with the central system, the origin of the disc. or torus and the continuation of the

calyx with the external system is very distinct in this plant. The torus is evidently limited to the space between the inner vessels of the calyx and the wall of the ovarium.

Fabricia Fætidia, Sonneratia, Duabanga, Rhizophoreæ, Carallia, Lythrarieæ etc.

The group formed by the valvato-epigynous orders is almost as defined as those of the hypogynous orders.

2. *Sonneratia acida.*

Arbor. humilis, ramulis pedicellisque articulat. 4-gonis fol. obovato-oblongis carnosis, integris marginib. cartilag. venis secondariis subdistinct floribus terminal. solitariis binisve in pedicellis articulatos, articulatis magnis conspicuis. Calyce 6-partito.

Pet totiqem angustissim. lineari-lanceolat. venosa, apicibus æstivatione inflexis sinubus calycinis inserta, atro-sanguinea.

Filam. 00, longissima sanguinea apicibus albis, antheris reniformib. connectivo carnoso ampliato loculis angustis.

Stylus longissimus fusco-viridis. Stigma maxime varia foveolat. Fructibus maximis, basi calyce persistente stipat. baccat. pluri locul. polysperma, subhippocrepidiform, testa rugosa. Embryo coronat.

Hab. Ad littoram limosa. Ins. Madamacca: *Feb.* 1835. Odor. pulpæ subaromat. subgratus sapor acidus of sour cheese calycis laciniæ persistent patentes reflexæve fructus stylis longe apiculat.

3. *Sonneratia alba.*

Arborea, 30-40 pedalis, ramis abrupte terminantib. dichotomis, foliis oppositis obovatis obovato-deltoideisve, obtusissimis, subintegris carnosis glaucis penninervis fructibus superis terminalibus pendulis solitariis in pedicellis, 3 plo articulatis, papaveris capsulæ magnitudinis, globosus utrinque, complanatis basi calyce, coriaceo 6-8 partito laciniis re-

flexis, stipulis apice style reliquis conicis induratis coronatis pluri locularib. axi cellulosa. Semina in loculo quoque plura, testa membranacea albumen 0 cotyledons carnosæ planæ radicula supere longa plumula inconspicua.

Hab. Rhizophora inter quas frequenter occurrit Mergui Madamaca, Moulmein.

The septa are boney and run in every direction consequently most are spurious, the seeds have every imaginable direction.

Rhodamnia.

Rhodamnia cinerea. Jack.

Monoxera spectabilis R. W. Myrtus? spectabilis.

Common in Belookar jungle Malacca, also Mergui.

Frutex mediocris erectus ramulis teretibus, dense puberulis.

Folia opposita, petioli 3-4 linealis puberuli lamina lanceolata vel lanceolato-ovata cuspidato-acuminata coriacea, long. $3\frac{1}{4}$-$3\frac{1}{2}$ unc. lat. 12, 13 lineal, ramuli unius sæpe inæqualia, ob crescentiam terminalem innovantem, venæ primariæ 3 laterales 2 arcuatæ, vena intromarginali inconspicua, intervenius venis secondarius tenuibus oblique percursa, cæterum minute reticulata, obscure pellucido-punctat. Rather apparently dotted owing to ends of venules.

Subtus ad venus ferrugineo-pubescenta, alioque minutissima puberula.

Flores glomerulati in axillis in nodos insert. paucis raro plura septem pedicelli 1, $1\frac{1}{2}$ lineal subtus florem bibracteolat. cum calyce puberuli.

Calyx tubus semi ovatus limbus minute 4-dentatus. Petala 4 alba subobovata vel oblonga extus minuto puberula, patentia caduca, æstivat. imbricata.

Stamina circiter 40, fauce calycis inserta, filamenta gracilia filiformia petalis æstivatione erecta paullo breviora alba. An-

thera cordato-ovatæ basi affixæ, bilocul. stylus subulatus petala excedens glaber in alabastro uncinatus.

Stigma terminalis capilatus. Vertex ovaria planus glanduloso aspectu. Ovar. 1-loculare; placentis 2 parietalibus. Ovula 00, anatropa raphe vix plus quam ½ dimidiata.

Aspectus laurineus, ute etiam foliatio vel potius Memecylens mediante Ewyckia.

Tryzygium.

Tryzygium.

Arborea, ramulis laxis sæpe pendentib. fol. breviter petiolat. elongato-lanceolat. acuminato, pellucido-punctat. integerrimo glaber, juniora repanda a semper, floribus racemosis albis suaviter odoratis racemis e ramis vetustioribus ortis, abbreviatis densifloris.

Cal. tubo elongato clavato, brevissim. 5-dentat.

Pet. 5 caduca? ovat. stam. 00, filam capillare alba patentia.

Stylus subulat. Stigma simplex, subacute (petalo convoluto receptum?) Ovaria ad medium clavi circiter, bilocul. aliquando 3-pluri ovulat. ovula pendula foramen apicule.

Hab. In sylvis præsertim ad littora Ins. Madamaca: *Dec.* 1834.

Eugenia.

Eugenia purpurea.

Arbor 30 pedalis, formosa, ramulis compressis foliis breviter petiolatis 8 uncialibus, oblongo ovatis subrepandis, acutis, penninerviis venis intromarginal. conspicuis pellucido-punctatis marginibus diaphanis lucidis petiolis senioribus cinereis squamosis.

Racemis abbrevatis paucifloris, subcymiformibus floribus maximis pulcherrima rosaceis, conspicuis, pedicellis brevibus fuscis clavatis.

Cal. tubo turbinato 4-partit. laciniis rotundatis 2 interior majoribus. Pet. 4, rotundata, concava sepalis alternantis fauci calycina inserta, punctata rosacea. Stam. numerosiss. æstivat. inflexa ibidem inserta, libera, filament. subulata, rosacea. Anth. parvæ, bilocul. longit. dehiscent. connectivo rosaceo. Stam. interior omnia vestita, margo faucis calycineæ elevatæ glandulosæ crenulata pallide rosacea.

Stylus rosaceus subulatus staminibus, exterior vix æquans, stigma simplex ovarium 2-loculare multo ovulatum, ovula ascendentia et transverse. Placentæ carnosæ foramen hilum prope. Æstivat. petal imbricata.

Hab. Mergue. Kulweng, culta florem obsaporem acidum: *Oct.* 1824.

Barringtonia.

Barringtonia cylindrostachya.

Ramuli crassis apice foliosi.
Petioli basi valde incrassata.
Folia in petiolum decurrentia, lanceolata obovata caudato-acuminat. serrato-crenulato sub-repando. venis 2-dariis conspicuis simpliciter arcuata nexis, nexuris venam intro margin efformat ceterum reticulatis interveniis supra elevatis cum petiolo pedalibus vel ultra.

Spica exaxilla fol. lapsu spithamæa cylindracea, soldid-lilacin. covered with many white scars of fallen flowers, basi cicatricibus linearibus transverse.

Flores conjesti sessilis, cal. tubo 4-gono dentibus 4 rotundatis concavis.

Pet. 4 oblongo-rotundata concava. Stam. numeross. filam. capillaceis carnes 2 uncialia. Anth. basi affix.

Annulus cupuliform elevatus extus pallidis striatus (ob pression filamens) inters coccineis circa styli basin.

Stylus longissimus 3 uncialis sanguineo coccineis torus insertion stamen quadratus. Ovar. 4-loculare septis perfectis

tenuibus ovula 4, 5 angulo interior apice affixa anatropa superiora subascendent. inferiori subpendula obvenas tegum. exterior angulato-sulcat. foramine infero spectant.

Hab. Malacca at Verupha Aloor Gagal, a very distinct species.

B. foliis longe petiolatis lanceolato-obovatis caudato-acuminatis, spica cylindracea, robusta, ascendens (purpurea), floribus conjestis calycis 4-fida tubo 4-gono, ovario 4-loculare, ovulis 4-5 apicalibus fructibus.

This makes the 4th Malacca species.

B. racemosa.

B. conoidea.

B. alata.

B. cylindrostachya.

Barringtonia conoidea, Gr. Pl. DCXXXV.

Frutex vel arbuscula, ramulis subsulcatis.

Folia apices versus ramulor. confertis alternis exstipulatis e basi cuneato-cordatà obovato-oblonga breviter petiolatis subcoriaceis acutiusculis crenato-serratis.

V. secondar arcuatum nexis, interveniis reticulatis.

Racemis axillaribus vel rarius terminal. sæpius exaxillis vetustioribus, foliis brevioribus erectis, paucifloris.

Pedicellis in urceolum carnosum articulatis bracteis caducis, subclavatis fere uncialibus.

Cal. tubus subcylindraceus, of largish diameter basi processubus gibbosis 8, limbo bipartito laciniis ovato-oblongo reflexo patent. concavis post anth. erectis persistent.

Cor. ampliuscula, e petalis 4, mediante filament leviter gamopetalis ovato-lanceolatis carnoso-coriaceis, margine revolutis vel etiam convolutis.

Stam. 00, basi altiuscula connata, filam capillacea subulata longissimus.

Anth. basin versus affixæ orbiculari-cordata bilocul. Pollen in aqua 2-3 plicatum glabrum.

Ovarium omnino inferum, 4-loculare, ovulat. cuique loculo, ex apicem fere pendent. foramine hilum prope supero, stylus circiter longit. stamine sanguineo. Stigma terminal simplex majusculum. Fructus vide contra.

Fructus subbaccatus conoideus penduli pauci in racemo quoque basi alis suboctonis medium versus evanidis, apice calyce immulato connivent urceolo stylique basi coronat. viridis unilocularis endocarpio fibroso semini satis forme adherent.

Semen unicum subovat. ovi (pullet) magnitud.

Tegument 1-submembranacea tenue basis pluribus latis, e chalaza subradiant apicem geometri seminis fere attingent in concavitat. embryonis superfice quasi receptis.

Embryo conferrumin. superficei sulcis parum profundis exarat. squamulis ut videtur nullis.

The original axis of ovarium is in B. racemos, pushed to one side, laying close to the inner wall of endocorp, and is to be easily mistaken for a linear raphe-like placenta from the apex of which the seed hangs, about the apex of the seed, as in that species the abortive ovula are to be found.

Systema centrale subovutum indistinct.

The seed of Barringtonia is sufficiently remarkable, I imagine the central part represents above, the radicle; below, the plumule, and I also imagine that all the parts between the lowest scales of the superficies and the radicle is adherent cotyledon, or is it an instance of an immense radicle, and two or several minute cotyledons (represented by scales and an inconspicuous plumula.)

To this, which is suggested by the radicular central system being internal, not reaching the superficies, there is a great objection in the irregularity in number and situation of the scales. The internality may arise from the cotyledons being produced into basilar auricula concealing and enclosing the root, as occasionally happens.

The development only will clear up the point, for even if

the scales become enlarged foliaceous during germination, they will not, I think necessarily become plumularily, some cotyledons during germination becoming decidedly leafy.

On the whole, this peculiar embryo appears to me distinctly analogous to that of Dracontium and in a less degree to that of Cryptocoryne.

The leaves are distinguished from those of B. racemosa by the cordate or even bi-auriculare base, and by the consequent less spathulation.

Can this be B. alata Wall. Cat. e Moulmein.

Species distinct, fruticosa, racemis erectis paucifloris, loculis ovarium uniovulatis, calyce basi gibberibus. Fructibus conoideis, basi alis carinisve amplis (gibberibus ampliatis.)

HAB. In limosis ripis rivuli Malacca consociata cum Tylophora, Cerbera, Barring. racemosa. Pandano, Pothos, Sarcolobo.

It is here, that we have a direct passage Ternstræmiaceæ and Guttiferæ, Lindley says no characters have as yet been assigned to these plants by which they may be known from Myrtaceæ except their alternate dotless leaves, yet under Lecythidaceæ, he says that though combined by D C., and others with Myrtaceæ they differ most essentially in their alternata often serrated leaves without pelluced dots.

Fætidia cannot belong here.

Pl. DCXXXV.

1. Plant reduced about $\frac{1}{3}$.
2. Flower bud.
3. Flower.
4. Corolla base of.
5. Corolla and stamina long section.
6. Æstivation.
7. Anther lateral.

8. Back do.
9, 9. Pollen in water $\frac{1}{10}$.
10. Pistillum.
11. Apex of style, shewing the stigma.
12. Transverse double section of style shewing its vascularity.
13. Long section of ovarium.
14. Transverse double do. of do. near apex of cells and where they are not complete to each placenta are attached two ovula, one of these however is not seen always.
15. Do. lower down, where the septa are complete.
16. Ovulum.
17. Do. long section, I am not sure whether the inner bottle-shaped thing is nucleus alone or nucleus and second tegumen closely cohering, but think the latter.
18. Gemma, to shew the vernation and exstipulation.

Pl. DCXXXVI. Fig. I.

1. Fruit of B. conoidea.
2. Long section of same.
3. Pericarp for the most part cut away, intended to shew the raphe-like axis of the ovarium at *a*, *a*, *a*. An abortive ovulum is seen near the apex.
4. Seed.
5. Base of do. shewing the ramifications of the raphe.
6. Do. long section, *a* plumula end of central system, *b*, *b* end of peripherical system, where two notches are seen.

B. racemosa, Pl. DCXXXVI. Fig. II.

1. Fruit of B. racemosa.
2. Do. half pericarp. cut away.
3. Seed detached with raphe-like original axis, ovarium barren ovula also represented.

4. Plumular end of seed shewing the minute scales.
5. Transverse section of seed shewing the indentations or furrows of the embryo corresponding to branches of raphe.
6. Long section, *a* apex of plumular end, *b*, *b* primary or first formed scales, *c*, *c* secondary formed do.

Careya.

1. *Careya herbacea*, Pl. DCXXXIV. A. Fig. I.

Sepala 5 basibus coalita persistentia. Pet. 5 æstivatione imbricata hypogyne demum aucta.

Stam. 5 petalis alternant toro paulo elevato inserta. Ovarium unicum 1-loculare, sessile in toro staminifarostylus filiformis. Stigma peltato-capitat.

Fructus indehiscens subglobosus petalis ampliatis foliaceis odoratis patentissimis suffultus. Semen unicum Cl. Linnea. Pentand monog. Ordorat. Cassuvieæ.

Hab. Arbo polygama, alta magna faciæ mangiferæ resinosa folia lanceolata coriacea irregulariter pellucido-punctato. Paniculæ florum axillares terminalisque.

Dioica bracteolæ 2-subflora, cal. profund and partit. in lacinias 4 persistentis imbricatos.

Pet. 5 hypogyna sepalis opposita ! ! æstivat. imbricat.

Stam. 00, hypogyna subrubra. Antheræ adnatæ lineares, apice truncatæ. Fæm. cal. corollaque ut in mar. Stam. 00 hypogyne abortiva. Ovar. 2-loculare super loculis 2-ovulatis, ovulis pendulis styli 2 breviss. stigmato 2, reniforme maxime inciso-dentato.

Baccæ supera globosa, exsucca, calyce persistente subampliata stipat. 2-locularis, irregulariter valvata rumpens.

Fructus subglobosus pomi magnitudine, calycis laciniis persistentibus apicibus sphacelatis, rectis tubum efformantibus coronatus, velutinis styli basi persistente api-

culatus (caro copiosa spongiosa aquose, 4-locularis indehiscens, loculis distincte formæ variæ pluris permi. Semina ovula compressa angulis interioribus affixa, carne quasi nidulantia glabra, cinereo-brunnea.

Tegumentum simplex e membranes 2 coalitis, quorum interius tenuissimum album in externis brunneum.

Hilum parvum.

Albumen carnosum album.

Embryo axillis indivisus albumine coalitus radicula conica ad hili latus versus. Plumula indivisa ad extremitata oppositis seminis.

The tegument adheres to the seed, so I do not yet know if scales exist on the surface of the embryo.

At first the long section shews only two notches, then it shews 4, the 2 lastly nearly enclosing the plumula, the whole periphery except where the teeth are, is densely cellular, the inner part and the teeth are much less opaque.

a. Arilla.
b. Inner tegum and nucleary combined.
c. Embryonary, thick below like young albumen, above very thin.
d. Testa.
e. Raphe.
f. Free, so not nucleary.
g. Embryo.
h. Cotyledon.
l. Apex of plumula.
m. Belongs in appearance to the outer system.
j, k. White spongy.

2. *Careya pendula.*

Arbuscula, humilis fol. alternis apices ramulorum versus confertis, lanceolato-oblongis, utrinque attenuatis pedalibus et ultra, subserrulatis impunctat. penninerviis, veniis intra marginalit. indistinctis. Spicis e ramis adultioribus ortis,

longissimis, 2½ pedalibus sulcatis, densifloris, floribus magnis, e bracteatis calyce viridescent fusco. Pet. sanguineis stam albis.

Cal. subobovat. tubo ultra ovar. parum producto, 4-fidus laciniis rotundis erectis, persistent.

Pet. 4 calyce inserte.

Stam. 00, longissima basi monadelpha externis longior interioribusque breviorib. sterilibus. Anth. subulat. Anth. bilocul. longit. dehiscent. Discus epigynus luteus glandulosus annuliformis, styli basi cingens. Stylus longissima, 3-uncialis rosaceus stigma obtusum subcapitat. Pollen ovata læve hinc sulcat.

Ovar. 4-loculare, loculis pluri-ovulat. ovulis placentis axillibus transverse affixis subbiseriatis, ventricosis exostomia constricto septis tenuibus placentis apices versus ovuliferis. Pl. DCXXXIV. Fig. A.

Hab. Mergue. In sylvis collinis Patoor unica specimen, et spica una adheræ tantum vidi.

Careya pendula, arbuscula, foliis oblongo lanceolat. pedalibus utrinque attenuatis, floribus spicato racemosis, racemis pendulis longissimus. Odor. florum ingratus.

Careya macrostachya Jack, Mal. Misc.

RHIZOPHORACEÆ.

Rhizophora.

General Remarks.

In this tribe the radicle is developed before it reaches the ground, it passes out at the apex of the ovarium. The edges of the opening becoming brown and ragged. The exserted part of the radicle is green, it is at first subulated but after it has reached some length, its greatest diameter is

at about ½ from the apex. Towards the point the radicle becomes indurated and at the very apex, there is a brown callous spot. The induration increases in extent as the root increases in length. The anatomy is simple, from the collet to the commencement of the induration, it is entirely cellular. It consists of a rather thick outer tunic or bark, and of a central cellular part. The cells of the central part are rather larger, but otherwise do not differ from those of the bark, they are lax and of a rounded form, and contain many amylaceous globules. In the roots which have reached an inconsiderable length, the cells are chiefly of a brown color, but this color disappears in a great measure afterwards. Among the brown cells, larger and more prominent ones are visible. The central part is thickest towards the collet. The bark is thickest at the thickest part of the root. The woody fibre is very dense and coheres very strongly together. It has no connexion with the collet, and reaches in a radicle of 5 or 6 inches in length to an inconsiderable distance, say 1 or 1½ inches. The fibres do not occupy the whole of the substance except at the very apex. At a distance of 1½ line from this part, the original cellular centre is still visible.

Queries, are there stomata? 2. Is the fibrous tissue originally connected with the collet, or is it formed in an ascending direction? 3. At what period is the whole of the radicle occupied by this tissue?

Hab. Mergue.

1. *R. decandra*, Roxb.

Char. Frutex, foliis obovatis obtusissimis.

Pedunculis axillaribus floribus dense capitulatis sessilibus, calycibus 5-6 partit. staminibus 10-12.

Pet. concavis apicibus aristato erectis conniventib. laciniatis, filam. longiusculis. Anth. bilocular longit. intror-

sumque dehiscent. Pedunculis interdim 2-3 floris, floribus inconspicuis viridescent. Pet. albidis apices versus demum brunnescent stigmat. subsimplice obtuso, fructibus clavatis 5-6 uncial. sulcatis calycis laciniis patentibus nec reflexis. The radicle consists chiefly of cellular tissue, the proportion of woody fibre being very small and confined to the circumference of the central part.

2. *Rhizophora macrohiya*, Gr.

Arborea, foliis ovato-ellipticis, mucrona sphacelato-terminatis coriaceo-carnosis, subtus brunneo-punctulatis, venis secondariis indistinctis cymis supra axillaribus, subnutantibus, paucifloris floribus 8 andris petalorum marginib. dense villosis, fructibus maximis pendulis verrucosis.*

3. *R. pauciflora.*

Arbuscula fol. lanceolat. obtusiusculis. Pedunculis axillarib. petiolor. longitud. dichotoma 3-floris, calycis tubo elongato fusiformi limbo 8 fido. Pet. apicibus aristato laciniatis petalis subcucullatis, Anth. bilocul. longit. dehiscent filament longiusculis. Discus epigynous carnosus.

Fructibus cylindraceo-subulatis dentibus lævibus obtusis apicibusque foveolatis calycis fructus dentis erectæ radiculæ basin amplectent, floris subodorata contuse aromatica.

4. *R. parviflora.* Cotyledons ovatæ carnosæ plano-convexæ plumula conspicua intra cotyledons obcondit. materia lucida mucilaginos. nidulans.

In R. candilaria and R. macrorhiza. They are fleshy, coriaceous and consolidated, the plumula is very conspicuous and large received into the prolongation of the cotyledon, which

* See a paper in the Transactions of the Med. and Phys. Society of Calcutta, 1835.

is of the same appearance as the radicle and articulation with it at the base of the plumule.

The cotyledons are more or less conical from the middle upwards.

In R. decandra they are broadest at the base or upwards. The fungous substance which surrounds the base of the cotyledons of these 3 species appears to originate from the coats of the ovulum, which at a subsequent period become detached and pushed towards the bottom of the pericarpial cavity. In these three species the apex of the ripe ovary, is exserted, in other words, it is only $\frac{1}{2}$ inferior, coupled with this, we have cotyledons of a peculiar form and consolidated, and the bases of which are naked.

5. *Rhizophora stylosa*, Gr. Pl. DCXXXX.

Arbuscula, gemmis 3 uncial. subulat. fol. longiuscule petiolatis lanceolato-obovatis vel oblongis, coriaceis, subtus insigniter punctat. cuspidato-mucronatis, margine sæpe recurvo superne indistincti penniveniis. Pedunculi axillares dichotomi, dichotomis sæpius, dichotome 4 flori. Bractea cupuliformis subbiloba subflorem quemque et quamque ramificatur.

Cal. tubus obconicus laciniæ 4 triangular ovata.

Pet. reflexa margine leviter recurv. villosiss. per æstiv. anth. anteposit. $1\frac{1}{2}$ amplecteis.

Stam. 8 sessilia, his petala ante positis mucronatis aliis obtusiusculis, stylus longus. Anth. subæquans apice bifid.

Stigmata simplicia indistincta. Ovar. biloculare loculis biovulatis ovulis pendulis tegmine crasso unico.

Obs. The walls of the cells laxly cellular, almost filamentous, particularly in the fundus where this lax substance is of considerable amount.

Fructus pendulis collatio exserto. Radiens pedales subu-

lato-clavata leviter verrucos. calycis tubus obovato obpyriform, laciniis immulatis reflexis.

Hab. Malacca. In littoribus limosis, Pulo Bissar.

Differs from R. conjugata in its smaller stature, length of style, and smaller radicles, more villous petals, more elongated base of flower, etc.

The species are very difficult of discrimination, no characters can be drawn from the leaves.

1. Portion of a plant nat. size, except the fruit, which is not fully developed.
2. Bud, the sinuses have subprocesses, wherein another approach to Lythrariæ.
3, 4, 5. Views of expanded flowers.
6. Partium situs et alternation.
7. Lateral of anthers, alternate with petals.
8. Oblique of anther opposed to petal, I am not sure whether the one is mucronate, the other is emucronate always.
9. Transverse of anther.
10. Calyx and pistillum, one lacinia of calyx removed.
11. Long section of pistillum, below the ovula is much lax filamento-cellular substance, a provision for the rapid growth of the embryo.
13. Ovulum.
14. Long section of do., I am not sure whether they have a second tegmen or not, if so, it is united to nucleus the cavity of which at this period is very distinct.

The ovarium of Rhizophoreæ, is at an early period altogether superior, consisting of two fleshy scales with their margins rolled in; if mature it would be described as ovaria e folliculis 2 compositum.

The calyx then consists of 4 triangular thick coriaceous sepals, entirely enclosed in the connate bractes, the inner angle meeting in the axis; except at the base, it is at a later period, it becomes inferior.

The stamina appear as of the innermost locullus was much the smaller.

If the above sections be compared, it will be seen that the line of attachment of the ovula remains throughout nearly the same, and that the principal changes consist in the elongation of the so called tube of the calyx which is obviously nothing but pedicel.

In R. conjugata the slight inferiority of the cells, if at all is perhaps more evident. In both what is sufficiently remarkable the epigynous or rather hypogynous disk is an evident extension of the ovaria tissues.

In both the appearances of inferiority are heightened by the disappearance of the lax tissue of the apex of the pedicel, by which a cavity for the most part inferior may be obviously formed.

Another circumstance, to be borne in mind, is the precise line of discretion of the sepals, for the two do not correspond, if this be taken from the outer edge, the cells are not inferior at all, if from the inner they are slightly.

The phenomena are included in an elongation of the pedicel, by which the calyx appears furnished with a tube, and by the development of a glandular disc from around the base of the ovary, by which the petals and stamens are elevated above the original common line of attachment.

In this instance there is nothing to warrant the adhesion of the calyx to the ovarium, the parts always maintaining their original correspondence.

(*Candelaria.*) ***Rhizophora.***

Arbuscula foliis ovatis mucrona sphacelato terminatis, coriaceo carnosis subtus brunneo punctulatis, venis second, distinctioribus. Pedunculis axillaribus bifloris, petiolis 3 plo brevioribus, floribus 12 andris, fructibus subulato clavatis, sublævibus nutantibus.

These two species are with respect to foliage very similar.

The trunks of both are supra terraneous. The first is a low tree, the second has scarcely any trunk, being a mere crown, the base of which reaches the high water mark.

In R. odorata, the petals only embrace during æstivation their respective stamens, they are white fleshy and sweet smelling. The structure of the anthers is very remarkable the connective is fleshy and large, the pollen is lodged in cavities arranged closely along its flattened sides and right and left with regard to the axis, these cavities or sacs have no mutual communication, the cuticle of the connection at any early period entirely continues with the substance, a short time before expansion separates along the flattened sides into unequal valves, the inner of which becomes entirely free from its original connection, except at its base, the outer by far the larger remaining attached by its apex and base. The connection is thus exposed, it presents a locular appearance, the areoli corresponding to the originally closed sacs. The inner valves at a more advanced period incline inwards over the style and stigma. The same organisation occurs in R. Mangle.

The direction of future separation of the valves is indicated by a faint linear depression. Both these species have the same structure of roots, *i. e.* soft and exceedingly fine woody fibre, imbedded in lax amylaceous cellular tissue. The bark contains in abundance hard roundish bodies, lodged in cavities of the nature of which I am quite ignorant.

6. *Carallia densiflora.*

Arbor. humilis ramulis compressis fol. breve petiolat. ovatis oblongo-ovatisve crenulatis coriaceis, longitud. latitudinem duplo superante.

Cymis axillaribus oppositis dichotomis folio brevior capitellatis, densifloris floribus inconspicuis viridi, albis, odora forte ingrato.

Cal. tubo brevi ad medium usque bipartit. laciniis lanceolatis acutis, persistent æstivat. valvatis.

Pet 6-7 ovata, inciso-sinuata, sinubus calycinis inserta, quoque stamen oppositum æstivat. fovens. Stam. petalor. numero duplo, libera perigyna filam. crassa subulata, tubo calycina ad medium fere ejusdem parietibus accreta papillosa. Anth. bilocul. longit. dehiscent. versatilis. Pollen oblonga discus perigynus elevatus crenulatus crassus ovaria basin cingens.

Stylus filiformis, stigma capitat. 4-lobum, lobis rotundis cruciatis. Ovar. semi inferne nempe basi disco perigyno aceret, 4 locul., 2 ovulatis, ovulis pendulis, dispositione introrsum obliquis, foramen superne hilum prope ovul. integument. ovula per distincte, stipulis uncialib. caducis.

HAB. In aquosis circa Mergui : *Dec.* 1834.

BRUIGUIERA.

Bruiguiera. 10-*angulata*, Gr.

Foliis ad apices ramor. confertis petiolis uncialibus laminis lanceolatis acuminatis integerrimis, one side with a longitudinal flattish depression, vena centrale distinct, secondariis arcuatis, subtus etiam indistinctis.

Gemmar. squamis 2-uncialibus subfoliaceis.

Alabastrum decurvatis.

Floribus axillaribus solitariis oppositis, ascendent vel ½ nutant. Pet. 6-7 linea albus amplis 1½ uncial pedicello tubo calyce duplo brevior.

Cal. tubus obconicus, 10-angulatus, angulis cum ochroleucus rubro tinctis laciniis trigono-subulatis, duplo longioribus, apice incurvis, alternis.

Petala castanea conduplicato, elastica semi aperient laciniis calycis paullo breviore margine breve villosa ad medium fere biloba, sinu longe setigero lobis infra apicem paullo 1-setigeris.

Stam. 2 in sinu cujusque petalo. Filament filiform alba glabra contorta. Anth. linear connect. basi breve.

Stylus subulatus. Stigma radiis 4-bicalcaret minutis, petala æquante.

Ovar. 9, 10 angulata.

Ovaria 1-loculare, placentis 4 ad centrum productis sed non unitis, intimo margine incrassato utrinque 1-ovuligero, ovula, 8 pendula.

The ovary is distinctly 1-celled at the base, all the ovula coming out together even from the pressure in cutting a transverse section, underneath the mass of ovula is a cruciately divided white cellulo filamentous looking substance.

This is the contrary of what usually happens with regard to septa of compound fruit, which are very commonly incomplete towards the apex, but never, so far as I know complete in the middle and incomplete at the base.

Evidently an undescribed species unless it is Loureirois R. sex angula.

2. *Bruiguiera parietosa*, Gr. Pl. DCXXXXI. B. eriopetala.

Fructus patentes vel pendula, calycis tubus ampliatus, obconico-pyriform angulis obsoletis tot quot sepalis, usque alternant. Sepal. immulatis patente ascendentibus incurvat.

Tigellus exsertus $2\frac{1}{2}$ uncialis, sursum leviter curvatus, inæquilateral. apice constrictiusculo, viridis obsolete sub 6-gonus.

Collet. much constricted, cotyledones hæmisphærieæ spongioso cellulosa, contained in a thick coriaceous leathery tegument, attached above round the base are the remains dark brown of the abortive ovula.

Number of parts of flower uncertain 8 to 12, of ovary sometimes 3.

Plumula conspicua viridis.

1. Plant natural size.
2. Petal laterally from a bud.
3. Same after dehiscence.

4, 5. Same after dehiscence, the bimucronate base of connective shewn in 5.
6. Front and back view of do. after dehiscence.
7. Pollen.
8. Long section of ovarium.
9. Cross do. of style.
10. Upper part of style.
11. Long double section of upper part of ovary, shewing that the placentæ form a pendulous mass with the ovula, that does not reach to the fundus of the cavity.
12. Upper ovula.
13. Lower do.
13. Transverse of ovarium near the fundus of the cavity.
14. Do. about the centre, the part where the placental intrant angles reach the axis nearly.
15. Lower down, do. near the lower free end of the placenta.
16. Long section of fruit, *a* testa, *b* cotyledons, *c* plumula.
17. Placenta, ovula and base of style, the rest of ovary cut away, ovules in pairs in this nearly collateral, pairs divided from each other by a cellular floccous substance.

Circumcision of ovary of Bruguiera another generic distinction.

3. *Bruiguiera Rheedii*, Pl. DCXXXV. Fig. IV.

a. Circums. capsule.
b. Radicle.
c. Cotyledon.
d. Radicle.
e. Barren ovule.
f. Plumule.
g. Cotyledon.
h. Line of rupture.
i. Ovula tegumen.
j. Radicle.
k. Collet. *l*. Cotyledon.

MEMYCYLEÆ.

Apteuxis.

Apteuxis trinervis.

Fruticosa glabra foliis oppositis breviter petiolatis ovatis acuminatis obtusis, subcoriaceis, 5-nerviis, nervis 2 lateral tenuibus, floribus cymoso-paniculatis, cæruleis, paniculis axillarib. trichot. foliis multoties breviorib. Pedunculis pedicellisque angulatis articulatis, bracteis minutis ad articulum quemque. Cal. tubo globosa extus areolato limbo truncato brevissima 4-dentato. Pet. 4. Stam. 8 æstivation inflexa, connectivum e glandulosum basi 1-denticulat. margine calycis insidentia cærulea, stylus filiformis, cæruleis longe exsertus. Stigma obtuse 4-gonum ovarium calyce adnatum, 4-loculare, placentis carnosis 4, parietalibus ovulis 00, ascendentibus, foramen hilum versus.

Hab. In sylvis, Mergui : *Kalwing, Aug.* 1834.

The same.

Cal. intus plicis nullis, tubo globoso limbo subtruncato brevissima 4-dentato. Pet. 4, stam. 8, connectivum e glandulosum basi 1-denticulatum. Stylus longe exsertus, stigma obtusa 4-gonum, ovarium 4-loculare, ovula 00, placentis, 4 carnosis parietalibus affixa.

Frutex glaber. foliis oppositis, acuminatis 3-nervus inflorescentia axillari-cymoso-paniculata. Nomen dedit apteuxis quoniam calyx plicis eget.

Char. Memycylon emendandus, nempe. Stam. in specie una, (M. buxifolium mihi.) 4-connectivum 1-glandulosum, ovarium 1-loculare 9-ovulatum, ovulis placenta centrali breviss. affixa, 8 demum abortientibus. Semen erectum.

Memycylon.

Memycylon cordatum Gr.

Foliis subsessilibus, ovato-cordatis obtusis, glaberrime integerrima carnosis marginib. diaphanis revolutis, sparsum pellucida punctatis, floribus umbellat. saturati cyaneis, tubo extus rubescente umbellis abbreviatis, axillaribus alternis nec oppositis. Pedicellis brevibus medium versus articulatis ibique bibractealatis, colora infra articulo virida supra rosaceo.

Cal. truncatus mucronatis 4 loco dentium. Pet. 4 (æstivatione convoluto,) intus bases versus intense cæruleis.

Stam. 8 calyce parum longiora, 4 sepalis, 4 petalis alternantia. Filam. breviss. cæruleæ connectiv. maximum, antica 1-glandulosum. Anth. infera quoad connectiv. bilocul. longit. dehiscent.

Stylus filiform cæruleis stigma fusiform cæruleum, ovarium inferrum sed liberum, carpella plura 9, circa axim 0, disposita, 1 ovulata, demum, 1 spermum reliquis pushed to one side and abortive. Radicula hilum versus.

Hab. Ad littora ins. Madamacca: *Aug.* 1834.

2. *Memycylon ramiflorum.*

Arborea ramulis sub 4-gonis, foliis breviter petiolatis ovulibus ovatisve, oblique emarginatis subintegrisve, juniorib. marginibus et nervo primario purpurascent seniorib. marginibus cartilagineis. Inflorescentia umbellato-corymbosa ramulis 4-gonis, floribus in umbellis, terminalibus, parvis.

Calyx carneis, limbo fere integro. Corolla pallide purpurea. Staminib. saturatius. Stylo stigmatique rosaccis, exsertis, Bracteola minima ad basin pedicellorum.

Hab. In aquosis. Bagtow, Mergui medula accedit.

Ovarium ut in aliis, 1 loculare, 9 ovulatum.

MELASTOMACEÆ.

Gen. novum.

Frutex scandens, caulibus teretibus glabris fol. distantia, petiolis superne papillus subulata hispidulis gerent, oblongo-ovat. basi cordata acuminat. 5-nervia, glabra. Paniculis terminalibus et in axillis foliorum summor. ramulis sub 3-flores. Pedicellis basi articulatis, lateralibus bibracteolat. bracteolis caducis, medio nudo, floribus inconspicuis parviusculis. Pet. extus albida intus carnea.

Cal. tubus ovatus ultra ovar. longiusculi product limbo truncato integerrimo, exappendiculato fauce annulo, petala stamenque gerente subclausa.

Pet. 4-5 sessile ovulia subpatentia.

Stam 8-10 ibidem inserte alterna petalis alternantia sterilia complanato corpus erecta dilatat. viridescens, lobata denticulatumque dorso planum, lateribus basi vel simplicibus vel in calcarib. dorsum productis calcare utrinque filamento approximato, intus e medio limbo processus calcariformis subulatus longissimus filam excedens oritur fertilia filam. conforme sed latiora. Pl. DLXXXV. Fig. VIII.*a*, inner, *b* outer. Antheræ per æstivat. inflexæ longissimæ poris terminal dehiscent connectivo loculisque basi plus minus in loculis, viridulis denticulat. product. Stylus subulato filiformis exsertis stigma truncat. papillosum ovarium 3-loculare poly-ovulat. ovulis placentis carnosis intus productis affixis.

Ovarium calycemque in his loculis. Antheræ per duration? saltem per anthesin nidulant.

Ov. calyce superficie omne nec adnat. sed calycis paries interior 4-5 ties in ovarium inflectitur cumque accrescit. adeo ut loculi 4-5 ad sunt inter. Pl. DLXXXV. A. Fig. XI.

Melastoma.

Melastoma glauca, Pl. DCXXXVII.

Obeckia.

Obeckia sp. Pl.DCXXXIX. Fig. I.

Sonerila.

Sonerila bullata Gr.

Ramulis compressis, the broadest side sulcate, fol. longe petiolat. petiolis apicem versus, planis supra et marginat. fol. subcordato, vel elliptica basi subcordata acuminata integra glabra supra nitentissima, interrenusque bullato-clavatis, subtus pallidus supra atro viridib. 5-tupli veniis. Paniculis terminal et ex axillis folior. paris ultima ramis tetragonis, plus minus ferrugineo-furfuracea divisionibus utimis subumbellatum florigeris basi bracte folior. couduplicate decurva.

Fl. numerosiss. inconspicui viridescent minute 3-lineales.

Cal. media infra ovatus sursum ampliatus, ore lato 4 dentato, extus farinoso furfurac.

Pet. convol. imbricata demum patentia calyce duplo brevior lata ovata.

Stam. 8 uniforme alterna minora omnia fertila filam. calyce fere duplo longiorib. Anth. adnate arcuatæ apice poro 1 dehiscent. Connectivo basi centralia in subulam apice trisetosam product, discus 4 gonus carnosus, epigyna.

Stylus robustus declinatus calyce paullo longior. Stigma simplex punctiform.

Ovaria in basi ovata calycis hinc adnat. the longer stamen alone in æstivat. between it and the calyx, to any depth, 3-loculare, ovula 00, placentis carnosis, exangulis central product affix.

Hab. Malacca. A remarkable species, certainly allied to the cordate, Sonnerila from Ayer Punnus. The species is remarkable for its bullate very shining leaves.

2. *Sonerila picta.*

Caulibus ramosis simplicibusve 4-gonis, rubescent cum petolis, fol. lanceolat. utrinque acuminat. serratis penninervus linea alba, marginibus irregularibus vel maculis albis confertis utrinque nervi medio. Racemis terminal. axillaribusque 4-gonis, secundis, apices versus rosaceis diaphanisque, floribus conspicuis pulchra rosaceis.

Stam. 3 filam. sursum, curvat. rosaceis. Anth. subsagittat. flavæ longius. acuminatæ apicibus poro 1 dehiscent.

Stylo longiusculo rosaceo subulato declinato, stigma capitat. albidum.

Cal. albidus. Pet. extus parea pilosa.

Hab. Mergue. In rupibus ad margines nervi prope Palar, *Oct.* 1834.

3. *Sonerilæ* sp.

Fol. cordato-oblongis obliquis strigosis subtus sanguineo-purpurascentibus. Pet. 3 oblonga rosacea in dorso subhispida. Stamen anth. lutea medium supra purpurascent, variat: foliis supra atro viridibus pilisque purpureis.

Hab. In rupibus umbrosis, Churra, *Oct.* 11*th*, 1835.

4. *Sonerilæ* sp.

Caulibus pedalibus, fol. oblongo ovatis, rugosus basi inæqualibus supra maculis crebris rotundatis albis medio piliferis, subtus secus venas purpureis. Racemis secundis apice dense floriferis.

Hab. *Churra, Oct.* 11*th*, 1835.

5. *Sonerilæ* sp.

Herba minima variabilis, uncialis simplex vel 3-4, uncialis ramosave, caulibus ramisque scabris rubescentibus foliis

ovatis novem pilosis, pilis magnis in petiola attenuatis, floribus breve pedunculatis.

Pet. suborbicularib. rosaceis. Stam. 3 antheræ ovatæ basi cordatæ ibidem affixæ, erostratæ! declinati ut stylus ruber antheras excedens.

Hab. Khasyah mounts. Inter gramineas, in collis Nungklow: *Nov.* 17*th*, 1835.

Trembleya.

Trembleya Rhynanthera.

Suffruticosa, erecta, ramosa. Rami scabri, subtetragona juniores squamosa. Fol. petiolat. lanceolat. acuta, subintegra, 5-venia, supra glabra, subtus glauca et squamis minutissimis pilisque scabra. Petioli semiteretes. Flores conspicui rosacei terminales 4-5 congesti quorum centralis e bracteatus, ante alios florens. Bracteæ inæquales infera major.

Cal. superus, tubo cylindrico undique squamis imbricato 5-partit. laciniis lanceolato-linearibus, acutis, sinubus latis, ad sinum quemque squama major. setigera.

Pet 5 ovata fauce inserta sessilia, laciniis calycinis alternantia.

Stam 10, fauce paullo infra petala inserta, 5 fertilia, maxima, sepalis, 5 minor. sterilia decolorata petalis opposita. Filam. filiformia connectivum coloratum, maximum, curvat. ad basin bilob. anth. adnatæ, membranaceæ, apiculatæ, l-locul. apice poro dehiscentes, steriles connectiva processu basilari 0, decolorata, sinuato repandæ.

Ovarium 5-loculare ov. ovulat. placentis in loculis productis, ovula numerosa, stylus filiformis exsertus, stigma subcapitat. virida.

Hab. Ad vias et in graminosis circa Amherst et Moulmain, copiosa, *Dec.* 1833, *Jan.* 1834. *Melastoma malabathrica* Linn.

Sarcopyramis.

Sarcopyramis grandiflora, Pl. DCXXXIX. Fig. II.

Pet. carnea.

Cal. obversa pyramidatis, 4-angulat. dentibus compressis, 3-angularibus marginal supero utrinque alato, ciliato filam. subulato complanata, apices versus et externe dentes 2 erectus gerentia.

Anth. biloculares, loculis oblongis obtusissimis rectis, intus et infra apicem (ad apicem connectiva) poros 2 dehiscent ovaria apice libero membranaceo colorato 4-angulari sub 4-aluto, margine repanda circulari.

Stylus crassus semi exsertus ex apicem ovarii. Stigma capitat. papillos. Ovar. 4-loculare placentis cruciatis intrantibus.

Pet. æstivatio convoluta. Antheræ per æstivatione inflexa inter ovaria apicem liberum parietesque calycis, dentes inter apicem ovario stylumque.

Hab. Khasya mounts. In rupibus umbrosis humidis, Moosmai, *Oct.* 13*th*, 1835.

Pogonanthera.

P. pulverulentum.

Frutex 3-4 pedales, ramulis petiolisque, brunneo furfurac.

Fol. opposita oblongo vel lanceolato-ovata carnosa, subintegra obtusa acuminata margine recurvo basi biauriculata, sæpius subobliqua, trivenia venulis transversis (primariis) subdistinctis. Panicula terminatis, rubro-ferrugine ramis, 9-3 chotomis.

Flores minute, rubro-ferrugin. extus furfurac. farinos.

Cal. urceolatus (tubo subgloboso obtusa 4-gono ore constricto limbo amplifacto 4-fido laciniis erectis.

Hinc infra media processum carnoso subdentiform pilosiusculo. Anth. adnatæ apice porosæ.

Pet. 4 æstivat. leviter convoluta lanceolata, reflexa margine fimbriatato, sprinkled with yellow farina.

Stam. 8 æqualia, fertilia, connectivo rubro basi pilis albis paucis deflexis. Stylus leviter declinat. Stigma subcapitat. Ovar. inferum omnino 4-loculare placentis profunde reflexis, angulis intrant apice ovuliferis.

Ovula 00.

Hab. Malacca. In sylvis littoralibus, Taugoung cling in arenos.

ALANGIACEÆ.

Marlea.

Marlea unilocularis.

Ramuli petioli foliaque subtus ferrugineo-tomentosa, the leaves much less and only at the veins.

Fol. alterna exstipulata ovalia vel obovato-oralia breviter cuspidata, patentia undique, supra atroviridia lucida subtus reticulata venatio quodammodo Artocarpea, generally oblique 3-veined at bases.

Spiciæ abbreviatæ petiolis breviores axillares, pauciflora subermiformes, (flores tribracteat), præ fragrant ferrugineo-pubescent.

Cal. superus obconicus tubo 6-sulcato, sulci oppositi sinuses, ad medium 6-partit. laciniis dentiform.

Pet. totidem alternantia valvata coriacea extus pubescentum e basi latiori lineares a medio reflexo patent.

Stam totidem calycinis dentibus opposit. filam. dilatate brevia ad medium versus dense barbato-villosa. Anth. adnat. linear bilocular.

Discus epigynus well developed crassus 5-lobus, lobis petalis opposit.

Stylus clavato columnaris pubescens four-striatus, apice subulatus, united with stigmatic lines confluent at apex (in really bifid, branches intus stigmatos agglutinata). Ovar. omnino infera 1-loculare. Ovule 1, ovulum pendulum anatropum raphe completa! exactly as in M. begonifolia.

The filaments adhere slightly to the petals, they are arched, broadest at middle, the upper hairs ascend the lower ½ descend.

Fragrance delicious like Pergularia, the stigmatic canal has four angles, stylus basi alternatus.

Evidently Marlea or Stylidium or something very much like it.

The petals and stamina except in situation, put one in mind Loranthacea.

No difference between it and Marlea except the 1-celled ovarium, but as M. begonifolia ought to have 4 cells instead of two, this perhaps is not of much weight, minor differences exist in sulcate calyx, its more pronounced lobes, and the lobed epigynous disk, the habit is very distinct.

CORNACEÆ.

Cornus.

Cornus, Pl. DCXXXIV. A. Fig II.

I doubt whether this order ought not to be placed in the neighbourhood of Loranthaceæ, Olacineæ and Santalaceæ, particularly as the nature of the perianth is nearly as obscure as it is the above mentioned orders. It is almost continuous with the structures from which the calyx is derived, its æstivation is valvular.

However the lobes of the stigmata are opposed to them, and this is a strong objection, because two organs in double series of the same denominations never are opposed. This at least holds good with regard to the calyx.

The hairs on the back of the petals are attached by the middle.

The ovary is certainly pluri-compound the normal number is pointed out by the lobes of the stigma, which are four,

and by the number of vascular fascicles of the style which are four on the axis of each lobe of the stigmatic canal.

The ovula are solitary, and curiously situated, they are transverse with regard to the ovary, although their conformation is entirely similar, the ordinary ovula having ordinary direction. The nucleary ends of both ovula point to the same direction.

HAMAMELIDEÆ.

Hamaelis.

Hamamelis sp. Pl. DCXXXIII.

Bootan collection Tassangsee: *Feb. 12th*, 1838.

1. Branch natural size.
2. The alabastrum ½ developed.
3. Flower.
4. Do. laid open pistillum removed.
6. Petal.
7. Section of do. shewing its conduplication.
8. Calyx and genitalia petals removed.
9. Stamen.
10. Do. face.
11. Do. anther just opened.
12. Do. anther more opened.
13. Do. fully opened.
14. Do. after dehiscence face.
15. Do. do. face.
16. Do. do. side view.
17. Pollen.
18. Germin.
19. Do. ovarium laid open longitudinally.
20. Very young ovula.
21. Ovulum from a flower full brown.
22. Longitudinal section.

COMBRETACEÆ.

COMBRETUM.

1. *Combretum formosum*, Gr.

Frutex longe scandens, fol. oppositis, elliptico-ovalibus, subintegris, glabris obtusis. Racemis axillaribus terminalibusve, simplicibus paniculatisve ovato-cylindricis, diametræ $1\frac{1}{2}$ uncianum, pedicellisque brevibus filiformibus calycibusque extus breviter velutinis. Bracteis minutiss. membranaceis, decidius floribus numerosiss. majusculis, petalis interdim staminibusque sanguineo tinctis.

Cal. infundibulif. 4-partit. laciniis ovatis acuminat. reflexis æstivatione valvatis.

Pet. 4 ad sinu calycinos. inserta ovalia minute reflexa.

Stam. 8 fauci calycinæ inserta, filam. subulata inæqualia, per æstivatione introflexa. Anth. bilocula longitudinaliter dehiscente versatile exserta longe. Pollen oblonga læve, dilute brunneum lineis 3 longitudinal (an pluribus?) notat. Discus calyce adnatus ad insertionem stamina terminans ibidemque crenulatus pilosusque.

Stylus subulat. longe exsertus. Stigma simplex ovaria calycis tubi parti inferæ adnat. 1-loculare, 2-ovulat. a pluri ovulis funiculis longis ab apice loculi pendentib. foramine hilum prope.

Hab. Mergue. In sylvis Kulweng: *Dec.* 1834.

2. *Combretum*.

Arbor. magna.

Folia subconferta ad apices ramulorum cuneato-obovatis vel obovata, alterna exstipulata concava obtusissim. emarginata ven. 2-dariis arcuatum nexis interveniis reticulatis. Petiolis ad apicem fere incrassatis. Gemmis conico subulatis squamis inconspicuis.

Pedunculis basi incrassatis foliis subæquant.

Fructus, subsessiles, subovata vel subrotunda compressa. $2\frac{1}{4}$ inch long $1\frac{3}{4}$-2 broad, glabri apice cicatris perianth lapsa, basi interdum oblique, mesocarp. crasso succulente granuloso, on a transverse section radiating. Endocarpio ligneo, with large angles or wings, radiating obscurely through mesocarp 1-celled, 1-seéded.

Seed relatively small, pendulous from a longish apical funicle oblong cylindrical attenuata at both ends, tegument membrano-cellular, cotyledons concentric folds convolute radicle superior long subclavata.

Plumula inconspicua,

Hab. Malacca. Aloor Gollah, Verrupha: *July* 1*st*, 1842.

3. *Combretum.*

Frutex scandens, fol. opposit. Pet. filamentique lacteis Antheris luteis longe exsertis, capsules ovatis alis 5 maximis membranaceis, glanduloso pilosis, junioribus, rosaceo tinctis.

Mergui scandens in fruticetis, *Feb.* 1835. Legi etia Moulmein, 1834, qua copiosa.

Quisqualis.

Quisqualis. Cal. ovario adhærens ultra cum in tubum longe productis, apex 6-dentatis post anthesin ad ovario apicem circumscissus. Pet. 5 perigyna, sepalis alterna sessilia. Stam. 10, alterna longiora, exserta petalis, alterna breviora inclusa sepalis opposita. Filam. perigyna subulato.

Anth. biloc. longit. dehiscentes. Stylus filiformis exsertus stigma obtusum. Ovarium 1-locul. 5-angulat., 3-ovulatum, ovulis pendulis funiculo crasso longo foramine ad hilum sito.

Frutex scandens ramulis velutinis teretibus. Fol. oppos. ovat. basi subcordata subcuspidata, breviter mucronata, inferne villosiuscula, spica terminales bractea lanceolata utrin-

que attenuatæ villosœ. Calyx extus velutinus, petala permum albi, demum varie rubri. In hortis circa Madras: e Burma introducta, *Oct.* 29*th*, 1832.

LUMNITZIERA.

L. Pentāndra.

Arbor. humilis ramulis fuscis apices versus tantum foliosis, foliis sparsis, cuneato-spathulatis, subsessilibus subemarginatis carnoso-coriaceis integris.

Racemis terminalibus plurifloribus pedicellis brevibus. Petalis pulcherrima coccineis.

Cal. basi bibracteolat. bracteolis minimis suboppositis tubo cylindrico ovario omnino adnato limbo 5-dentato dentibus erectis rotundis.

Pet. tot quot dentes lanceolata iis alternantia fauci calycino. Stam. 5 petalis alternantia, ibidemque inserta inseria filamentis longis exsertis subulatis coccineis. Anther terminal bilocul. longit. dehiscent. Pollen oblongum læve, sulcis 3-4? corporibus apicis stillatis pollen abortive mixtum.

Stylus filiformis longus coccineus. Stigma papillosum subcapitat. Ovarium parietalibus carnosis 1-locul. ovulis 3-4 pendulis foramen hilum prope stylus hinc altius calyce adnatus, ideoque lateralis videtur.

Alangeis et intermedia Combretaceum flores aspectus. Fuchsiæ folia vernatione convolutive calycis limbus persistens.

Fructus calycinis dentibus subconnivent coronatus drupaceus, 1-spermus testa membranacea simplex cotyledons subconvolute cornosa radicula supera plumula inconspicua.

HAB. Mergue. Inter Rhizophora, Madamacca: *Sept.* 1834. Æstivation corollæ imbricata stamina tunc apicibus inflexa.

Terminalia.

1. *Terminalia fœtidissima*, Gr.

Ramulis cicatricibus fol. notat. sericæis apicibus tantum foliosis, fol. sparse longe petiolata obovata integra brevissima abruptique acuminat. subtus reticulat. glaucescentiaque, marginibus cartilagineis. Racemis axillarib. multifloris, nutantibus petiolos excedent. floribus per anthesin dense congestis breviter, pedicellatis, bracteatis (bractea decidua membran. ad basin pedicelli ferrugineo-piloso,) pallide fusco lutescentibus villosis, pessima odoratis, odora stercoraceo.

Flores polygami. Per. tubo brevissimo basi planum, 5-partit. laciniis ovatis, reflexis, æstivatione valvatis, extus pubescens intus dense longeque villosum.

Stam. 10 exserta, quorum 5 longior sepalis, 5 breviora petalis opposita, ferrugine. Filam. subulata. Anth. per æstivat. inflexa, versatilis bilocule longitudinal dehiscent. Discus epigynus parum elevat. aurantia repandus, tube faucem circumdat. Pollen oblonga utrinque subtruncat. 1-3-sulcat.

Hab. Mergui : *March*, 1835.

Stam. tubus longior, ovatus. Stylus subulat. exsertus, stigma subsimplex ovar. per tubo adnat. 1-loculare 2-3 ovulat. ovulis pendulis ab apice locula foramen conspicuum superum.

2. *Terminalia lancifolia*, Gr.

Arbor. 20 pedalis ramis laxis. Ramuli teretis velutini. Fol. opposita vel ternatim aggregata fere sessilia, oblongo-lanceolata apice emarginata integra subrepanda e glandulosa coriacea penninervia utrinque ad venas pilosa, marginibus discolorib. spicæ hermaphroditæ, terminalis sæpius aggregati $1\frac{1}{2}$ unciales erectæ, velutini bracteatæ 2. Pedicelli crassi. Cal. 5-fid. pilosus. Pet. 5-linearia subsessilia inter sinus calycinos insert. serieca.

Stam. 10-petalis demissius inserta 5-sepalis 5-petalis opposita exserta. Filam. filiformia. Anth. terminalis oblongæ bilocul. longita dehiscentis. Ovarium calycis tubo adnatum 1-loculi 2-ovulat. Ovula pendula. Fig. IV. Pl. DCXXXXIV. Foramen apicem versus. Stylus filiformia exertus, stigma simplex 1-filam. ante anthesin intus curvata 2-bractea linearis pilosus ad basin cujusque floris.

Hab. Moulmein. Ad margines humidas sylvarum, flores, *Dec. Jan. Feb.* 1834.

Char. spec. Fol. opposit. ternateve, oblongo lanceol. obtusa subrepanda, ad venas pilosa, integra marginib. discolor. spica hermaphrod. 2-3, conferta terminalis erectæ. Petioli velutini, brevis.

HALORAGEÆ.

Myriophyllum.

Myriophyllum tetrandrum.

Herba aquatica ex maxima parti immersa caulis subsimplex cellulosus teres, fol. verticell. sessilia immersa multo majora pectinato-pinnata infima (exserta) minima pectinat. pinnatifid. superiora linearia arguta serrata, 6 verticillata, flores hermaphroditi solitarium subsessilisque in exillis foliorum minuti, pulchri. Petala caduca alba an interdum calyptratum cohærentia.

Cal. ovario-adnatus acuti 4-gonus limbo 4-fida laciniis erectis, pedicello brevissimo basi lateraliter utrinque bractia capillacea pinnatifida alba suffult.

Petala tot. quot. dentis calycinæ sinubus inserta patentia caduca æstivatione imbricata.

Stamina 4 epigyna ad bases dentium calycinam inserta. Filam. capillaria exserta, petala subæquantia æstivatione recta. Anth. erectæ lineares, fere longitudine filamentora, biloculares, longit. lateraliterque dehiscentes. Pollen globosum simplex læve.

Ovarium inferum e carpellis 4 compressis monosporis formatum. Ovula pendula styli 0. Stigmata 4, papillosa angulis calycis ideoque petalis opposita, patente recurva. Fructus inferis, e nucibus 4 vel paucifloribus, abortu angulos lævibus compressis conflatus. Semen arcuatum pendulum.

Embryo axilis arcuatus, radicula inversa. (Semina fructusque maturus nondum visus.)

Hab. Bengal. In aquas stagnantib. prope, Jumalpore: *Sept.* 17*th*, 1835.

Habitu Hipperidi affinis. Partum situs et alternantio quam maxima regularis.* Fig. V. Pl. DCXXXXIV.

a, a. Bracteæ lateralis pinnatifidæ.
b, b, b, b. Sepala.
c, c, c, c. Petala.
d, d, d, d. Stamina.
e, e, e, e. Carpella stigmataque papillosa.

Myriophyllum indicum, Gr.

Caulibus cellulosis, foliis immersis tenuissima capillaceum partitis, emersis lineari spathulatis, apice serratis, vix verticellatis, floribus bibracteat. bracteis ovatis subrhombeis denticulatis, carpellis tuberculatis spinis demum muricatis? solubilibus, embryone rectiusculo. Epicarp cito fungosum solubile, endocarp. osseum, tuberculisque abeo ortum ducentibus tunc spiniformibus.

Hab. Bengal. In aquis profundis fere stagnant. *Sept.* 38*th*, 1835.

Species a M. tetrandro distinctiss. ob formam bractearum, carpellisque tuburculatis, et epicarpio lapso muricatis.

* Anatomia caulis. Medulla obsoleta corpore centrale e ligneis fibrosis, interne laxiorib. externe densiorib. vasisquibus dam spiralibus ductisque intermedis, Peripheria cellulosa aeris cavitatis numerosiss. radiantes.

Cercodia.

Cercodia,

Ovarium aspectu Rumieis 4 angulatum e calycis sepalis post eorum separationem adhuc ovario adhœrentibus exortum polyloculare, ovulis pendulis carpellorum parietes dura, carpella pomacearum aliquarum mentients, stigmata 4, apicibus pennicellata cruciata et sepalis alterna æstivatio calycis imbricata. Folia sepalia opposita reliqua alterna arguta serrata. Pedicelli 1-flora basi bisetacea. Flores uni vel multo-axillares.

Goniocarpus.

Goniocarpus rubricaulis, Gr.

Prostrata radicans caulis sanguinea, fol. ovata lævia mucronato-serrata. Paniculis spiciformibus erectis floribus breviter pedicellatis pendulis, ovario 8-suicato osseo, loculari styli 4 subulato apice papuloso. Stam. 8 anth. sanguineæ. Pet. unguiculata pantentia limbo carinato-concava sanguineo-brunnea, filamenta longitudine, sepaloram quæ herbacea. ovarium rubescens.

Hab. Ad vias: *Churra, Khasyah Hills,* 17*th,* 1835.

ONAGRARIÆ.

Jussieuia.

Jussieuia floribunda, Gr.

Caulibus repentibus radicantibus teretibus radicula corporibus fusiformibus maxima cellulosis immixtis junioribus rubescent floriferis erectis foliis obovato-lanceolatis, in petiola attenuatis subacutis, subintegris ciliatis subtus punctatis floribus solitariis magnis albis. pedicello folior. duplo fere demum excedentis breviora.

Calyce basi bracteis 2 suboppositis, tubo pubescente, laciniis 5, tubum æquantib. apicibus revolutis patalisve. Petalorum ungues luteo 4.

Stam. 10 alternat. minora discus epigynus pilosus staminifer.

Stylus stamina paulo superans, stigma peltato capillaria 5-sulcatum, ovarium 5-loculare, ovulis 1-serialib. pendulis, foramen hilum prope.

Hab. In aquis stagnant, Mergui: *Sep.* 1834.

2. *Jussieuia longipes*, Gr.

Herbacea erecta ramosiss. pubescens ramis ascendent. caulibusque sulcatis angulatisque, foliis breviter petiolatis lineari-lanceolatis, acuminatis, obtusis scabris nervosis, floribus solitariis axillaribus brevissime pedicellatis.

Cal. 4 partito, laciniis 3-nerviis ovatis acutis patentibus.

Pet. 4 luteis stam. 8 alternis paulo brevior petalis oppositis stylo brevissimo stigmata capitato.

Capsula 4-gona elongata, 8-nervia, nervis 4 angularibus sepalis alternis breviter pubescens 4-locularis. Placentis carnosis in loculos productis seminib. 00 serialib. ovulis pendulis foramen hilum prope. Pollen ovata ternatim quaternulimve aggregat. filis mixtum.

Hab. In aquosis, Mergui: *Aug.* 1834.

OLACINEÆ.

Olax.

Olax sphærocarpa.

Caulis erectis angulato sulcat. fol. subdistincta oblongo-lanceolatis margine revolutis.

Floribus solitariis in axillis, albis pedicellis foliis multo brevioribus calyx annulus sub 3-denticulat. demum urceolatus.

Petala 3 in toro annuli more ovarium apice emarginat. basin cingens insert, ½ erect, ½ super patent, more crucifer. æsti-

vation viridescent valvate apicib. subintroflexis cum denticulis calyces alternant.

Stam. 3 petalis oppos. corum una in apices versus inserta introrsa bilocular. longit. dehiscent. filam. dilatat. brevia. Utrinque stipata sub staminodiis albis cellulosis, bipartitis extrorsus concavis stylus breviusculis. Stigma capitat. 3 lob. Ovar. superum, ovula e placentæ centralis apice conico pendula in loculis totidem receptis.

It is difficult to ascertain the venation exactly, but if the filaments are scraped off, each petal will be found to have two large vascular bundles, the intervenia being supplied by backward anastomosis. Hence it is probable that each is composed of 3 pieces, and this would explain well the situation of the staminoid and stamina or as the petals are simple emarginate it is also obvious that they may be composed of two, the fertile stamen alternating with them.

The stamina do not derive their vessels from those of the petals which is against the last hypothesis, on the contrary these petaline vessels exactly alternate with stamens.

There is something analogous to an articulat. in the staminoidia, and the vessels of these are more distinct than those of the central part.

The ovula are certainly nucleary, at the time of flowering, one is fertilised, and this presents a curious membraneous appearance along the side or edge next the placenta.

Stamina appear equally developed from an early period.

The ovula are worth examining, it would seem as if in the fertilised but abortive ones, the only ones I have seen there is a tube along the inner edge, and perhaps protruded from the apex. Fig. II. Pl. DCXXXXIV.

Although Mr. Brown plainly shews, that the common mode of adhesion is in pairs, the want of correspondence of the petals, vascular fascicle (3 its excentricity) with the vessels of the sterile stamens must be borne in mind. The thing is easily settled by early observations or by examining the venation of those Olacineæ with the 5th petal free.

Olax loranthiformis, Gr.

Frutex longe scandens, ramulis compressis foliis alterniis, exstipulatis breve petiolatis, lanceolato oblongis, obtusis, repandis coriaceis. Inflorescentia axillaris racemosæ, racemis simplicibus vel paniculatis nempe racemis sæpius 3 in pedunculo uno foliis multo brevioribus, gemmis floriferis bracteis undique imbricatis floribus brevius pedicellatis pedicellis basi 1 bracteat. luteis odoratis.

Cal. tubo brevi truncato margine ciliato-obsolitissima dentato. Cor. gamo-petala, tubo calycem longiore, limbo 5-partit. reflexo demum irregulariter fisso.

Stam. 10 corollæ, apices usque fere adnata distincto 5 fertilia petalis alternantia, 5 sterilia opposito. Filament. complanato, antherifera latiora crassiore breviorque. Anth. bilocul. longit. lateraliterque dehiscent. Pollen læve sub 3-angulare. Filam. sterilia, laminis membranacea petaloides convolutes ferentia antherum loculis nempe transformatis. Stylus exsertus filiformis, stigmato 3 capitata. Ovarium, rotundat. basin versus 3-loculare ovulatum ovulis pendulis ab apice placentæ centralis foramen inconspicue. Fig. V. Pl. DCXXXXV.

Placentatio santalacearum æstivat. corollæ valvat.

Hab. Ad littoram Madam. Pelut. Nov. 1833.

Foramen etiansi ovula perjuvenia examinavi nondum vidi apex ovule in cellular laxiori.

Ximenia,

Ximenia subscandens, Gr.

Ramis viridibus, verruculis brunneis crebris.

Ramulis sæpe in spinis subulatis axillaribus, rectiusculis abeunt.

Fol. alter. breve petiolata exstipulat. (petiolis articulatis basi) ovatis obtuse acuminatis coriaceis glabris veniis secondariis arcuatis distinctis, senioribus undulatis, emarginatis interdum cum vel aliqua mucronulo.

Racemis cymiformi, axillaribus vel subterminal. foliis brevioribus. solitariis, apice pauci florigeris.

Pedicelli ancipat. pedicellis, tot solicis quot dent. calyculi, calyculus basi planiusculus, $3\frac{3}{4}$ dentat. sinubus lobis.

Pet. tot. quot. dent. calyculi iis alternant erecta, apices versus reflexis, æstivat. valvat. intus apicibus tantum exceptis dense barbatis barba erecta alba.

Stam. 8 vel petalis numero duplo subæqual. 4 pet. 4 sepal, opposit. Filam. filiform tortis apice versus. Anth. magnæ adnatæ.

Ovarium oblongo-conicum stylus breviusculus stigma subcapit (terminal) sub 4-lob. fere complete 4-loculare. Placenta centralis.

Ovula 4 pendula ex apicem and below received into cells, so that the ovary is incompletely 4 locular.

Ovula oblongo-subulata apicibus subdilatat. simplicia.

Ovaria at base blackish, as if surrounded by a ring.

Hab. Malacca Tanjong Cling.

A true Olacinea.

Ximenia subscandens, fol. ovatis obtuse acuminatis, interdum emarginat. undulatis, racemis 3-5 floris, level topped, post anthesin racemiform pedunculis compressis pedicellis 3-4 sulcatis calyce 3-4 dentato (fructus immutat.)

Alternation normal not as Arnott says, two stam. opposed to each petal, although no dependence on number 4 or 5 in this species a tendency to it. Fig. III. Pl. DCXXXXIV.

1. Sepals.

2. Petals.

3. Stam.

4. Stam.

5. Carpellary.

Hairs of corolla under the micros. rigid. very minutely striate thickened undulated borders, at apex distinctly and broadly moniliform with traces of septa hence old undulations remains of monilus, septa disappearing entirely.

AMPELIDEO.

Cissus.

Cissus spicifera, Gr.

Scandens cirrhifer.

Cirrhi oppositifolia.

Folia petiolat. (petioli utrinque incrassat.) læte ovalia vel ovato-cuspidata, basin versus excepta distanter serrata aspectu Menispermeo.

Racemi spiciformis, oppositifol. vel terminalis, solitaria, vel dichotoma pendula pedules, like tails, sulcate thickened at the base and looking like the ends of the petioles. Flores subsessiles, 3-5 aggregati, alabast ovalia.

Cal. minutissimus a mere rim irregularly toothed round apex of pedicel.

Petala 4 margine valvate, margine apices versus quasi in duplica oblonga concava patente reflexa.

Stam. totidem petal opposita. Filam. longa, petiolis paullo brevior apice constricta. Anth. subcordatæ bilocular sinu affixa longit. dehiscent.

Ovaria magnum, apice areolat. lateribus exaratis lineis 4 profundis in quibus filament nidulant bilocul. stylus sub 0. Stigma obtusum locul. biovulat.

The apex of the ovarium marked with 8 ovate or lanceolate impressions, ovula ascendentia anatropa (with two integument.)

Fructus disposed as the flowers, ovuli elliptic green, size of a small gooseberry baccate containing 2 oblong, plano convex erect seeds with a castaneous tegument, curiously intrant into fleshy albumen.

Embryo in the axis of the base of the albumen. Radicle longish subcompressed, inferior cotyledons, ovato-cordate with broad base, white flat foliaceous veined.

Fruit marked especially towards apex with black longit.

lines converging to summit. Pollen in water globular with inconspicuis pores, granular aspect.

So far as I can see although the difference in inflorescence is so remarkable, this scarcely differs from Cissus. It has no torus whatever. It is to be considered as a cymose spicate form.

Embamma.

1. *Embamma heteranthum*, Gr.

Scandens.

Cirrhi gracilis setacea oppositifol. foliis longe petiolat. ternata, foliole anguste lanceolat. mucronato acuminat. distanter serrait, subtus pilis basi elevatis hirta, subtus albo tomentosa. Petiolis caulisque novellium ferrugineo-tomentos. lateral leaflets $\frac{1}{2}$ cordate at base outwardly.

Peduncles of frondose inflorescence cirrhigerous near the base, with the frond pinkish. The inflorescence is the same as that of Embamma similarly caudigerous, but flatter less lobed, along margins project, a few distant stout spoke-like stalks tomentose.

Immersed flowers, surrounded by an irregular edge (of the frond), 3-4 petals. Petals triangular cordate concave with subinflexed margins insertion narrow, twice as many, opposite anthers large cordate inserted in sinus, bilocul. longit. opening.

No style, stigma inconspicum, ovary 2-celled, ovules 2 erect, collateral transversely broadest.

Apex of stalks of marginals dilated, into a cup-bearing petals and stamens as in those of disc.

Ovary same as in discoid but immersed, $\frac{1}{2}$ inferior, 2 ovules in each of the two cells ascending, style more prominent than in those of disc.

Hairs tomentum long. irregular spiraly twisted. Raphides very numerous. Frond reticulately veined, veins

appearing to be anastomosing into a circle round each flower, the ovary supplied by branches from this ring.

The chances are against Pterisanthes, being really distinct.

The marginal flowers are exactly like the others, even to the rim from which the petals and stamens arise.

Embamma heteranthum, fol. ternatis, anguste lanceolatis subtus tomentosis floribus marginal pedicellatis.

Hab. Malacca. Verupha Aloor Golah. An approach to Pterisanthes.

2. *Embamma caudigerum*, Gr. Pl. DCXLVI.

Habitus omnino Cissi vel Vitis. Partes novellæ arachnoideæ lanata cirrhis oppositifol. fol. ternatis, ovato-lanceolatis distantes dentatis dentibus mucronigeris, subrepandis lateral lateri exterior obliquis basi subcordatis. Each serraturs and point ends in a fleshy mucro.

Cirrhis florigeris oppositifoliis infra medium pedunculum sanguineo-rubra incrassat. pendulum exserent spadix alatolobata, vel potius ex axi et alis 3 oblongo-triangularibus alternant tunc nudificatur. iterum apicem versus loba alii minores ambitu rotundato apice imo clavato incrass.

Flores imbedded in the dilated portions, generally on its surfaces, a few are marginal. The amorphous end of the cauda, also bears 2 or 3, they are arranged in oblique lines, those of the two surfaces do not correspond, they are arranged in oblique lines, which at the truncate end of each wing (or base of angle) follow its curvature. Each flower is surrounded by a roundish brownish cicatrix, then comes the rim of the calyx, thickened very obscurely, 4-toothed, then the petals, flat and valvate in æstivation, expanded, they are recurved, reflexed. Pet. triangulari-cordata viridescent. Stam. 4 cum petalis secernent iis opposite filam. reflexæ. Anth. magnæ biloculares introrsæ. Pollen triporat.

Ovar. e fundo cavitatis conicum, not projecting beyond the level of spadix.

Stylus sub 0. Stigma terminal simplex inconspicuum, bilocul. loculis 2 ovulat. ovulis erectis anatropis.

Hab. Malacca. In sylvis ad majora, Ayer Punnus.

This is a remarkable form, apparently allied to Pterisanthes of Blume, it is interesting as shewing a spadicose inflorescence, and venation analogous to that of Kaulfusia, each flower being surrounded by a net work and a ring of vessels, given off from the main branches. This also is interesting as shewing the nature of the cirrhi.

I have a Vitis in which a passage to this inflorescence takes place, the flowers being arranged on panicled spikes, the confluence of these would produce a spadix. But what is the venation in these? what is the cicatrix round each flower? what is the Perigone of Pterisanthes?

Fruit not seen.

Obs. Differs from Pterisanthes in hermaph. all immersed flowers want of involucra.

1. Plant natural size.
2. Portion of spadix, the flower to the right before expansion, one during expansion, and one after fall of petals to left.
3. Petal and stamen, petal veinous shewn.
4. Stamen enlarged, 1 vasc. fasc. to filament.
5. Pollen.
6. Section double long of part of spadix through 1 flower, *a* cicatrix, *b* rim of calyx, in direction of length of spadix.
7. Transverse section of an ovaria, and part of spadix.
8. Ovulum as seen under pressure.

Leea.

1. *Leea gigantia*, Gr.

Fruticosa trunco simplicia, foliis maximis 4 pedibus latis, 3½ longis, supra decomposito pinnis oppositis foliolis lanceolato-oblongis 8 uncialibus obtuse acuminatis, grosse dentatis basi 3-nerviis cæterum penninervo subtus pallidis, foliolis lateralibus 2 inferior, terminalisque 3-foliolatis petiolatis, insertione tumidis, rubrisque, cymo terminali maximo subcirculari diameter 1½ pedum. Articuli rubescentibus, floribus numerosissimis calyce basi rubescente, petalis viridibus extus basi versus rubescent. Anth. biloculares, a medio supra tantum dehiscent. conniventibus, connectivo atro-purpureo et simul deciduis, ut in omnibus aliis speciebus, corona ochroleuca staminif. 5-dentat. dentibus subulato-conicis, ovarium 6-loculare.

Fructibus baccatis cerasi nigri magnitud. basi calyce persistent suffult, 6-locularibus, 3-4 loculis 1-spermis, sem. 3-4 abortient. circa axin radiate disposit. angulata, dorso rugosa, lineaque elevata longitudinal. notat. Testa pallide brunnea, ossea albumen carnosum 5-lobum. testa inter lobos product. ideoque album ruminat.

Fig. III. Pl. DCXXXXV. Shewing transverse section of the ovarium and angular face of the albumen, *a* prolongation from the longitudinal dorsal line, *b* lateral prolongation.

Obs. Affinis L. sambucinæ.

Hab. In sylvis Madamaca, Moulmein: *Oct.* 1834.

2. *Leea simplicifolia*. Fig. I. Pl. DCXXXXV.

Herbacea, caule obtuse angulato ad articulos tumido, fol. maxime petiolat. basi vaginante anguloso, cordato-ovata acuta repanda dentataque subtus pubescentia brevissima albidis penninervus pedalibus diametoro 8 uncialibus.

Cymis terminalibus dichotomis pedunculis sulcatis, bracteis minimis caducis.

Cal. breviter 5-dentatus dentibus apice sphacelatis.

Cor. 5 petal. pet. sessilia sepalis alternantia revoluto fauce inserta carnosa apicibus cucullatis et incrassatis, squamulæ 5 fauci inserta carnosæ albæ, petalis alternant.

Stam. fauce inserta, 5, petalis opposita libera subconniventia filam. filiform. intus inflexa nempe ad basin antheræ geniculata, purpurascens brevibus, connectivum carnosum oblongum. Anth. oblongæ adnatæ biloc. longe dehiscent. albæ.

Stylus filiformis brevis stigma subcapitat. Ovar. semeni ferum, 6 loculare, loculis 1-ovulatis ovulis ascendentibus foramen versus. Pollen ovatum læve hinc sulcatum aqua immersu, subrotundum papulis 3-fit.

Æstivation calycis corollæ valvata.

Hab. In sylvis prop. Mergui: *Sept.* 1834.

Spec. unicum tantum vidi. Habitu cissi anthera Melastomacearum. Florum aspectu meliacearum.

3, *Leea sambucina.* Fig. I. Pl. DCXXXXIV.

Fruticosa ramis flexuosis verrucosis, foliis 2 decompositis, foliolis oppositis 2 infimis, 1-vel 2 jugis cum impari reliquis oblongo-lanceolatis breviter petiolatis, grosse et duplicat. serratis acuminatis nervosis, junioribus lucidis, petiolis propriis et petiola ad articulos. rubescentib. stipulis petiolo adnatis et serrat. dimidio-ovatis, decidius. Inflorescentia cymoso-paniculata, cymis terminalibus, fructibus baccatis, nigris basi calyce persistent tecta, 3-6 spermis semen hinc planis, illinc convexis, testa coriacea albumine carnoso corneo lobato! Embryo minutus ad basin albuminis. Plumula inconspicua. Radicula teres, elongata acuta hilum versus.

Æstivatio corollæ valvata. Cal. tubo brevi 5-dentat. Cor. monopetal hypogyna, 5-partita laciniis reflexis, tubo calyce paulo longior.

Cor. penta loba, epipetala lobis apicibus recurvis, petalis alternantibus.

Stam. 5 sinubus loborum inserta ideoque petalis opposita.

Filam. longitud. loborum incurva. Anth. bilocul. longit. dehiscentes extrorsæ, interse cohœrentes deciduæ. Connectiva atro purpurea subsagittatum.

Stylus filif. inclusus. Stigma simplex obtusum. Ovarium superum biloculare loculis 1-ovulatis, ovulis erectis foramen hilum versus. Fig. VI. Pl. DCXXXXV. *a* transverse, *b* long half section and Fig. VIII.

Hab. In sylvis Mergui: *Sept.* 1834.

Obs. Ordinis distincta. Ampelideas habitu differens. Pluribus notis Meliaceis accedit. sed. staminibus epipetalis: 1-locularibus? petalis, oppositis differt. stipulisque.

In L. simplicifolia corona e squamis 5 in altus, 5-partita, ab omnibus necedit. albumina 5 lobo.

1. Flower.
2. Do. long section.
3. Anther cohering in an inverted cone.
4. Anther and filament; lateral.
5. Do. front.
6. Do. before dehiscence.
7. Pollen.
8, 9. Do. immersed in water.
10. Ovarium style and stigma.
11. Ovarium transverse section.
12. Ovulum, with the foramen near the hilum.

Vitis.

Vitis, Pl. DCXXXXV. Fig. II.

Fructus cymosi in cymum latum divaricatum disposit. ovates, basi calyce minimo 4-dentato suffulte in toro luteo parum elevato sessiles apice styli? basi notata baccato, 1 spermi. Semen erectum ovatum hilo punctiforme basi notat. apice marginatum, later. interiori paulo minus con-

vexum et hinc raphe simplicia lineari-angusta brunnea, in sinu emarginationis desinente notat. Chalaza inconspicua.

Tegument duplex utrinque adhærens, extus carnosum viride faux entrans internis brunnea induratum inflexum in albuminis substantiam.

Albumen corneum semin. conform. ruminatum secus faciem utramque lineis duabus, in facie exterior magis approximatis notat. in quæ lineæ mutuo junguntur ope venarum simplicia rarius bifurcatarum, his fauce interioris tantum profunde inflexis et superficia externa versus propeque terminant sæpe extrorsum curvatæ.

Embryo parvus oblique situs in cavitato albuminis hilum prope. Radicula teres hilum spectans. Cotyledones cordato-ovatæ planæ foliaceæ incumbentes, vel faciebus latioribus seminis parallelæ. Plumula inconspicua.

Hab. Assam Legi in sylvis, Cheikwar: *Feb.* 8*th*, 1836.

Species Cissi vel vitis.

Clematis.

Clematis inversa.

Scandens, caulibus fistulosis teretibus lineatis. Petiolis elongatis, teretibus, tortilibus paginæ longitudine, fol. oppositis subpetalis, ovatis, basi deltoidea, carnosis subdentatis, dentibus callosis obtusis basi 5-nerviis, nervis 2 lateralib. indistinct. racemis fructiferis valde elongatis, folia duplo superant. floribus oppositis distantibus, oo. compressis pilosis, caudatis, caude $2\frac{1}{2}$ unciali plumosa, stipitibus sub o. albumen copios carnosum. Embryo minutus in excavatione albuminis ejus ad apicem sita pulpaque repleta nidulans. Radicula supera. Pl. DCXXXXV. Fig. VII.

In sylvis humidis. Pullo: *Jan.* 1834. Clematis inversa.

BERBERIDEÆ.

BERBERIS.

Frutex rigidus erectus subsimplex ligno pulchra luteo, fol. pinnata, petiola ad foliolorum insertionem articulata, articulis tumidis, fol. ovata basi obliqua spinoso-dentata. Racemis (interdum paniculis) fasciculatis terminalibus, multifloris, floribus majusculis pulchre luteis. Perianth in seriebus 5 terminalis disposit.

Stam. irratabilia.

Hab. Khasyah mountains. Ovar. 1 loculare basi biovulata ovulis erectis foramen hilum prope.

Leontice.

Leontice secunda Gr. Pl. DCXLVII.

Planta pedalis. Radix tuberoso bulboso profunde in humum sita, areolis 5-6-gonis conspicua notata, radiculæ ex areolarum interstius, an semper, axis brevis e parte supera non areolata, squamis paucis munite parum exteriori brunneæ, interiores membranaceæ albæ stipulas quodammodo mentientes intereorum bases et pedunculi circumdantes.

Folia pinnata longe petiolata, petiolis ute pedunculus sursum (usque ad pinnulus) subincrassato et ad exsertionem (humi) rubro. Pinnulæ $\frac{1}{2}$ vel $\frac{2}{3}$ verticillat. spathulatæ glauceæ, apice sæpius trilobæ concavo-conduplicatæ secundæ pinnularum mediarum foliola numerosivia, sed sæpius 4.

Panicula cymiformis amplicia composita patentissima, flexuosa pluries dichotoma* bractea squamiformis membranaceæ ad basin cujusque ramificationis, semi-amplectens, adpressa concava.

* Not in the true dichotomous manner, but approaching to it because the terminal flower is most developed. It may be considered as dichotomous, one of the forks suppressed.

Pedicell sæpius elongati ad apicem subincrassati.

Calyx 3 sepalus, sepalis caducis oblongis concavis subpetaloideis rubro-fusco-tincti, imbricatis subvenosis.

Petal 6 biseriata æstivat. imbricata oblonga vel oblongo-obovata, patentia apice rotundata irregulariter dentata vel denticulata lutea decidua.

Stam. totidem opposita, hypogyna. Filamenta ad antheræ extrorsæ adnatæ biloculares valvatæ, valvis inæqualibus interior angusta non secedens, reflexa cito, exterior magna secedens ab omnibus adhesionibus apicali tantum excepta incurva revoluta, persistens.

Pollen oblongum, glabrum immersum primo effundit massam mucilaginoso aspectu tunc cito rumpitur.

Is the outer coat soluble in water, I think not, because after bursting, the pollen retains its color, and the inner coat is always colorless.

Ovarium ovatum uniloculare, carnisve subirregularibus alis pluribus sæpius ad ejus apicem bifurcatis munitus, sutura placentato distinctissimo crasso, stylus subnullus, stigma repando undulatum in massam capitatum dispositum.

Ovula pauca 5-7 placentæ parvæ basilari e sutura placental distinctur affixa erecta, interiora longius pedicellata, tegmine bina, foramine hilum prope.

Fructus non vissus.

1. Plant nat. size.
2. Bud.
3. Flower.
4. Pistillum surrounded by stamina.
5. Inner view of stamen, before dehiscence.
6. Outer do. of one dehiscing.
7, 8, 9. Anthers after dehiscence.
10. Pollen.
11. Do. immersed in water.
12. Pistillum outer face of.
13. Do. inner, shewing distinct placental suture.

14. Pistillum laid open along outer face.
15. Placenta and ovula, at *a* base of placental suture.
16. Long section of ovulum.

A curious plant, two species occur about this place, the leaves generally emerge from the ground at some distance from the inflorescence. The other species is very like this in inflorescence, but the leaves are simply pinnate. The inner valve of the anther *i. e.* the one not reflexed as valve, is the smaller, this is, I think always the case; but why the peculiarity of dehiscence depends upon this inæquallity is another thing.

Gen. Char. Calyx 3 sepalus, cuducus. Pet. 6 biseriata. Stam. totidem antheris valvatis. Pollen mucilaginosum, ovarium alato-carinatum, ovula plura, stigma undulato-capitatum. Herbæ pereniis cauli subterraneo-radiciformi tuberosa foliis pinnatis, glaucis ramulis secundis oppositis vel semiverticillatis. Panicula cymosa aphylla, flores majusculi lutei.

Species prima. Caulis areolis indistinctis pinnulis oppositis, late oblongis apice trilobis pinnula sæpius brunneo transverse fasciatæ.

Sp. secunda. Caule areolata pinnulis 4-6 semiverticillatis spathulatis apice 2-3 lobis conduplicatis. Præcedente paullo major. Pinnulæ fasciatæ.

Hab. Khasyah mountains.

DILLENIACEÆ.

Dillenia.

1. *Dillenia spiciosa.* Fig. III. Pl. DCXLIX.

Arborea, cortice cinerea ramis patentibus. Folia post flores evoluta, lato-obovata, crenato-repanda emarginata coriacea, glabra, juniora lucida, argute serrata serraturis mucronatis, utrinque et præsertim subtus ad venas adpresse

pubescentia. Vernatio conduplicata. Petioli marginato, pubescentes ciliati. Gemmæ squamis foliaceis velutinis, cinctæ. Flores terminales solitariis maximi, conspicui, lutei, diametro 4-uncialis, pedicellati. Pedicelli cum ramo articulati.

Calyx inæqualiter 5-sepalus, sepalis 2 exterior et 1 intermedio majoribus 2 interior minoribus, ovalibus obtusis, ciliatis adpresse pubescentibus.

Pet 5 sepalis alternantia, hypogyna sessilia cuneato-obovata, repanda, decidua.

Stam. 00, hypogyna pluriserialia, libera, seriebus exterior minoribus luteis, *duabus interioribus* 3-plo majoribus deorsum curvatis, citrinis. Filam. filiformia. Anth. adnatæ ad apices poris 2 dehiscentes. Torus ampliatus carpella 10, linearioconcalita, circa axim disposita, 1-locularia, ovula plura, biserialia, placentis axillibus affixa. Foramen hilum versus et ad latus inferius ovuli quoad placentam. Stylus sub 0, stigmata tot quot carpella radiatim disposita, linearia acuta, D. retusæ proxima sed distincta super collis.

In sylvis Molamyain Zinzaik, etc. : *Feb.*, *March*, 1834.

2. *Dillenia parviflora.*

Arbor. humilis, petiolis basi dilatat. foliis ovato-obovatis repando-serratis coriaceis subacutis subtus ferrugineo-pubescens venis secondariis conspicuis, floribus e ramulis ortis et ante folia juniorem explicitis, 2-4 aggregatis in pedicellis brevibus.

Calycis sepalis 3 exterior tomentoso-sericeis coriaceis, viridescent, 2 interior, glabriorib. subpetaloidis.

Pet. obovato spathulatis subunguiculat.

Stam. inæqualib. seriei intima maxima, stigmata primo aspectu simulant.

Stigmata 5-6 an plura, angustissima.

Hab. Mergue. In sylvis prope Tukeek : *Feb.* 1835.

Adest etiam iisdem sylvis copiosa species altera an D. ornata Wall. arbor. magna petalis obovatis, floribus magnis.

Dilema.

Dilema.

Arbor. formosa umbrosa aspectu Castanaæ versæ foliis confertis, oblongo-ellipticis subcuspidatis nervosis, serratis, serratuus rigidis, ciliatis supra nitidis læto-viridibus, infra pallidiorib. et ad nervos adpressæ pubescent. Petiolis canaliculata basibus ampliatis semiamplexicaul. floribus terminalibus, solitariis maximis diametri 3-uncialis, odore rosæ canicæ, sed minus gratæ. Pedicellis, 2-3 uncialibus, medium supra bracteat. Bractea foliacea, lineari-lanceolata decidua.

Cal. irregulariter 5 sepal, sepalis maximis ciliatis 3 interior major. fructiferis arcte connivente.

Pet. maxima subæqualia obovato repanda decidua.

Stam. numerosiss. inæqualia, seriebus 2? internis (an 1) duplo fere majoribus. Filam filiformia complanata. Anth. lineares adnatæ stam. brevior breve apiculat. longior emarginat. et sæpius in apiculat. poro cernio apice dehiscent carpella plurima.

Styli breves, stigmata tot quot carpelia radiantia lineari-lanceolat. plana longit. centraliterque sulcat. ovules 00 duplice nana, placenta cellulosa maxima.

Fructus magni pomi magnitud. sepalis ampliatis carnosis conniventibus obtecte pseudo multi-locularis stigmatibus radiantib. marcescent. coronat. carpella plumum radiate disposita peripheria versus libera, axin versus mutuo cohærentia, intus materia gelatinosa fæta, in quem semina nidulant. Semen angulo intrante affixa complanata plum. abortient. dorso pilis brevibus cellulosis cristato, testa subcoriacea, albuum copiosum, carnosum subcurvatum. Embryo minutissimis in regione umbilico. Radicule hilum obversa. Endospermum cum albuminum separans e membranis cellulosis duabus quorum interior e cellulis fibrosis longitudinaliter dispositis, fibris incompletis.

Wormia.

Wormia suffruticosa, Pl. DCXLIX. Fig. I.

ANONACEÆ.

Peltícalyx *Gen. Nov.*

Peltícalyx argentea. Gr.

Arbusculi ramulis flexuosis foliis lanceolato-oblongis basi cordatis obtusis breviter petiolatis subtus pulcherrima glaucis, floribus axillaribus terminalibusque pendulis longe pedicellatis cream-colored. Pedicellis foliis breviorib. pubescent. sursum incrassatis.

Cal. extus bractea peltata, suffultus, 3-sepal, sepalis ovatis.

Pet 3 exterior maximis ovato-oblongis clausis, carnoso (leathery) subrepandis, arcte clausis fere cohærentibus.

Antheræ, connectivo rubro ultra loculos. in capit rubro brevi producto.

Ovaria extus pilosa sericea, stylus breviss. stigma subcapitat. pilosum pauce ovulata ovulis 1-serialib. ascendentibus.

Hab. In umbrosis prope littoram Madamacca : *Sept*. 1834.

An bractea pro calyce habenda ? tunc cor. 6 petal, 3 exterior minorib. calycinis.

Fissistigma. *Gen. Nov.*

Fissistigma scandens, Gr.

Frutex scandens, fol. lanceolato-oblongis integris, emarginat. subtus glauces et parce ferrugineo-pilosis.

Racemis axillaribus abbreviatis foliis multo breviorib. pedunculis pedicellis bracteisque, ovatis floribusque extus ferrugineo-pubescent.

Cal. profunde 3-partit. sepalis ovatis obtusis. Pet. 6 interiora minora rubescentia ? glabra apicibus 3-angularib.

Stam. 00. Filam. sub 0. Connectiva roseo-coccinea ultra anther product. Anth. ednatæ, subsessiles loculis longit. dehiscent. Ovario 00, pilosissimæ, stylus sub 0 stigma bifidum. Ovula plura biserialia.

Hab. Mergue. In sylvis prope Thurapown, *Dec.* 1834.

Gen. distinct stigmata bifido, petalisque interior, coloratis, flores expandos nondum vidi.

Cal. profunde 3-partit. sepalis ovatis obtusis. Pet. 6, interiora minora coloratáque? Anth. subsessiles. Connectivum ultra antheram in processum obtusum product. Ovaria pilosiss. 1-locular. ovula plura biserialia, styli sub 0. Stigma bifidum.

Frutex scandens, inflorescentia racemosa axillaris.

Cyathotemma.

Cyathostemma viridiflora, Pl. DCL.

Cymis caulinis ex axilla veluste dichotomis patente nutantibus, dense ferrugineo-pubescent. Bractea oblonga concava dense ferugin. pubes ad ramum singulum, unoque paullo supra medium pedicellorum clavatorum.

Floris basis planiuscul. sub 3-gona ambitu sepalis 3 late cordatis patentissimis e basi subreflexa, ferrugin. pubesc.

Petal 6 duplici serie incurvato connivent and in corolla depresso urceolat. disposit. Pet. basi gibba vel subreflexa, æstivatione apicibus valvata, carnosis coriacea viridescentia ferrugineo-pubescent præsertim secus margines punctataque.

Stam. plura, cuneata, connectivo apice dilatato, projecting forwards over the apices of cells and arranged in a convex disc angulato-ferrugin. pubescent. loculis introrsis linearib. completis longit. dehisc. Pollen læve? e porosum ovato-rotundat.

Pistilla plura centralia, apices on a level nearly, with the upper edge of the corolla, angulate cylindraceæ dense pubesc. ferrugin. stylus sub 0, stigma magna oblonga glabrum emar-

ginat. ovula plura biseriata anatropa. Placentæ processus membrana distinctus inter series ovulor. interject.

This appears intermediate between Anonaceæ and Schizandraceæ, but I have not seen the fruit.

The wood is remarkable, the pith is very small. Ligneous system white subcruciately 4-lobed, sinuses of lobes concave, 2nd brown very thin opposite to angles of the white, but much developed and filling up the concave sinuses between the white lobes.

The vessels of the white lobes are large and frequently, the medullary rays are pronounced, complete and white in both systems, very large towards the circumference, and generally containing one or two linear faciæ both of white wood.

Medullary rays distinct continuous with back and medulla, the spaces between each *i. e.* the wood composed of fine dense fibres, and a subsingle row of vessels, (*scalarif.*), the brown part consists of transverse subundulated lines of woody fibre, and transverse oblong spaces filled with brown matter! These brown spaces are divided by septa, and probably the chief difference between the brown and white, is, that in the brown; the vessels predominate so much as to subdivide or break up the continuity of the fibrous part.

I know no anonaceous plant with a corolla like that of this one, although Artabotrys would resemble it, and several others if the lamina of the petals were absolutely abortive.

The flowers have no odour, but the usual aroma exists in the plant.

I only know the male flowers of kadsura or Sphærostemma, but this plant agrees with it in form of perianth corolla, in the bracteate padicel and in the valvate æstivation.

It is not however monœcious, and its ovaria, and anthers are decidedly (particularly the former) anonaceous, and so is the number of the parts of the perianth.

The wood, certainly tends to the menispermaceous structure.

Coniferous markings round or transversely oblong, exist on the larger vessels, while the cells are from end to end, and I see, appearances as if the markings were confined to oblong cells lining the scalariform ones, certainly so, that there would seem to be two forms of these cells, one simple membrane with a lining of coniferous marked cells, the others simply punctate.

Uvaria.

Uvaria mabiformis. Gr.

Scandens ?

Ramuli flexuosi folia obconduplicata concava, oblongo-lanceolata vel ovata integra, obtusis emarginata, glabra exacte ut in Maba vel Diospyros subtus glaucescentia et minutissima reticulata. Pedunculi axillares solitarii, petiolor. longitud. deorsum curvati parce bracteati.

Cal. basi planiusculus profunde 3-partitus, the outline is nearly triangular from a very broad sinuses.

Pet. abbreviate valvate, exteriora cordata, crassissime præsertim apicem versus (sessilia) basi concav. centræque carinulata. 3 interiores multo minores oblongæ conniventes apices versus cohærent *unguibus approximatis*.

Anth. 00. sessiles cuneatæ extrorsæ truncato-capitulæ, the chief part of torus occupied by the petals.

Pistilla pauca sub o seriata ovaria glanduloso punctata ovula 2 basi solida superposita, stigmata are longish viscid subulæ $\frac{1}{3}$ less the ovaria, at first sight altogether Diospyraceous.

Aloor Gagah, Verupha, *July*, 1842.

The branches are greenish inner petals quite hide the genitalia, and form together an oblong 3-furrowed body, outer petals scarcely opening, exceedingly thick and tough obtusely triangular. taken together.

Uvariæ sp.

Ramuli albidi fol. distant. breve petiolat. oblongo-lanceolat. longe et obtuse cuspidata, atro-viridia coriacea integra glabris (v. 2 dariis exceptis) indistincte venosa.

Pedunculi axillares, ferruginei bractes pluribus, distichis, ferrugineis basin versus, deorsum curvate. Fl. solitaria penduli magna, viridescent extus ferruginei.

Cal. basi planus areola obsolete 3-gona notat. (angles alternating with sepals) profunde 3-partitus laciniis 3 angular.

Pet. 6 carnosa biseriate, 3 exterior triplo major sublanceolata, basi late glabrata vix concava, utrinque præsertim extus pubescent ferrug. 3 interiora sericeo-pubescent unguibus distantibus in conum super genitalia connivent cohærente.

Anth. sessiles cuneat truncat. extrorsæ bilocul. connect. occupying whole breadth of apex, numerous in several series, ovaria in conum disposita series, styles filiform clavate very long, twisted, cellular scarcely stigmatose.

Space between their bases occupied by a large mass of light brown viscum, which is probably the stigma.

In the young state the styles are merely incurved, dilated and compressed, truncate at apex, furrowed longitudinally the margins of truncate apex along the end of sulcus looking rather stigmatic.

Stamina disposed in a subdepressed globular mass.

Pistilla when torn up from base, shew there 5 distinct veins, 1 middle, 2 lateral. Ovula 4-6 plura uniseriata.

Hab. Malacca. Aloor Gagah, Verupha: *July*.

Obs. This is like the Usesquipedalis. It belongs to same sqad as the lutea, but passing off, the limiting of the stigmatic, secretion to the lower part of the style, and its congregation into a central viscous mass is curious, so are the long styles, twisted inwards almost involute, at the apex the fecundating sphacelation is intense at base of the styles.

Uvaria heteroclita. Pl. DCXLIX. Fig. II.

Rami flexuosi, hinc illinc crebre verrucis (lenticellis) asperato. Folia alterna breviter petiolata (petiolis basi haud articulatis supra planiusculis), ovula acuminata, distanter obsoleteque dentata carnosa glabra. Fructus dense capitulos globosos axillares nutantes dispositis sublente pedunculo crasso squamato.

Carpella (immatura) plurima dense congesta globosa, vel obcompressione majorem ovalia, angulata pressione, apice areolo sub 4-angulo plano quasi truncato notata, hinc et postice linea membrana brunnea sphacelata arcte adhærente cujus apex stylum brevem simulat. orta stipata, sessilia, unilocularia disperma.

Semina transverse sita, pendula reniformia hilo terminationem lineæ brunneæ versus directo.

Pulpa futura baccar. arcte semin. adhærent. Tegument. exterius unicumque crassum extus brunnescens subcoriaceum, intus cellulos. an e secondinio adnato.

Albumen arcuatum, molle niveum membrana cellulosa secondinia pallidissima brunnea inclusumcæque adhærens, apice excepto prolongatione intus tegumenta externe secus curvatura maxima profunda, quasi dimidiatum.

Membrana nuclei apicem versus tantum distincto, imo apice sphacelata cæterum cum albumine secondiniaque adhærens.

Embryonis rudimentem subobcordatum ex apicem nucleum pendens.

Ejusdem generis cum Uvaria heteroclita Roxburgh, Fl. Ind. ed 1832, 2,663. quæ forsan eadem.

Suddyah : *Feb.* 2, 1836. Leviter aromaticæ omnia Anonacearum albumine integro excepto.

Uvaria (*Aichmanthera*) *odorata.*

Arbor. humilis cortice albescent. Ramis, ramulisque flexuosis subsimplicibus laxis, fol. alternis, in petiolis brevibus canaliculat. ovato-oblongis basi sæpius cordatis, aliquando obliquis cordatis, repandis integris supra atro-virid. infra fusco-viridibus maculis nigrescentibus pallidis floribus axillaribus racemosis, pendulis, primo viridibus demum luteis, magnis odoratissimis. Racemis paucifloris, interdum 1-floris aliis abortientibus pedicellis velutinis articulatis basi bracteatis.

Cal. 3-partit. basi plana sepalis coriaceis lati-ovatis reflexis!

Cor. 6-petal. biseriatis seriei extima majora, lanceolato-linearia longissima venosa. demum subrepanda marginibus revolutis.

Stam. 00, hypogyna, filam. sub 0, connectivum ultra antheram in apicula spinescente breve product. Anth. adnatæ introrsæ, stam demum brunneæ.

Stigmata turbinata capitulum aggregata: styli breves, ovaria plura 1-locularia, pluri-ovulata, ovulis 2 serialibus, carpella immature stipitata pyriformia, torulosa vel nec, baccata nempe pulpa repleta, seminibus 1-2 vel plura, transversis.

Pet. interior demum basibus conniventia! Genus distinctum Uvaria proxima distinguend.

Calycis sepala reflexa. Pet. interiore paulo minore. Anth. apiculo spinecente. Stigmata turbinata in capitulum ultra anth. productum, aggregata, ovula glabra, 1-locul. ovulis pluribus biseriatis, carpella glabra stipitata torulosa vel lævia, 1-2 sperma.

Hab. Mergui, culta: *Oct.* 1834.

The carpella in all apocarpous Anonaceæ? appear to be torulose if more than one seeded.

Artabotrys.

Artabotrys malayanæ.

Ramuli, bright brick dust ferruginous. Folia oblonga basi oblique cordata, cuspidato acuminata coriacea, subtus glaucescentia et advenas ferrugineo-pubescent (uto petioli et inflorescentia).

Pedunculi axillares, 1-2 flores, foliis multo breviores, bracteolis pluribus caducis fl. penduli lutei fragrantes.

Cal. ultra medium 3-partitus, laciniis ovario triangular patente ascendent. Pet. 6 longissima basi concava in globum conniventa, vix constricta linearia very gradually alternate to apex, extus pubescente biseriata, valvata.

Inner three shorter much narrower, scarcely dilated at base, leaving between the claws open genitalia, a transverse section would be sub 4 gona of the base 3 gona.

Anthers sessile, outer series ones effete, inner extrorse with purple mucros, cells looking as if they only contained two rows of pollen, grains connivent.

Pistilla several disposed in a cone, the apex of which projects beyond the globe of stamina distinct, ovaria densely ferrugina villous surmounted by a longish stigmatic subulus ovula few 1 seriate.

Peduncles of fruit much thickened subnutant, carpella sessile on a ½ sphærical torus, cylindical with a tendency to be torulosæ, 2-2½ inches long, vertically mullilocular, each cell with 1 seed, immature only seen, albumen ruminate.

Hab. Malacca Aloor Gagah, Verupha.

This belongs to the Artabotrys squad, known by the elongate valvate biseriate petals arched over the genitalia, and generally ? torulose fruits.

A sharp angle elevated line always ? decurrent from the base of the petiole, leaves above very nitent.

Fruit cell red sometimes somewhat angular fibrous, bac-

cate flesh sanguineous colours, seeds oblong ovate, greyish raphe complete obscure. Embryo basilar minute plates ruminating stout.

Sphærostemma.

Sphærostemma Blumiana, Pl. DCLI. Fig. I. II. DCLIV.

Frutex ramis sublævibus compressiusculis flexuosis brunneis. Fol. altera exstipulata in ramis articulata, ovato-lanceolata acuminata cuspidata integra glabra carnosa, semina pellucida contusa aromatica v. secundariæ irregulariter arcuata nexæ, pagina cæterum reticulata.

Flores solitaria axillares in pedicellis petiolos subæquantibus sursum incrassatis bracteate squamatis ! Bracteis imis in tegmentus exeuntibus. Alabastra globosa basi 5 bracteata bracteis inæqualibus 2 interioribus majoribus quorum una maxima, 3 exterioribus minutis ute hæ pedicellorum basi carnosus. Bractea maxima ut videtur postica.

Perianth imbricata distinctio corolla nulla, sepalis rotundatis, 10 sepal, sepalis inæpualibus exterioribus majoribus interioribus nanis, vel sepala 5.

Petala his alternantia interiora nana, æstivat. imbricata, 2 exterior, 3 interior.

Stam. 00, in disco conoideo elevato inserta, atrobilium Pini non male referentia.

Filamenta brevissima distincta connectivum præ alius dilatatum transversum, maximum carnosum. Antheræ parvæ albæ biloculares adnatæ sed non per omnes longitudinem connectivum insertæ longit. dehiscentis, adeo dispositæ ut antheræ externa visibiles compositæ sunt.

Stamina spiraliter disposita alternatum opposita.

Of this I have only seen young buds, the anthers are very curious, at least as regards their disposition, the cells of each are of course owing to the great size of the connectivum very distant, but as if some approximation was ne-

cessary, they are disposed so that the cells of one anther are closely applied to the near cells of the two contiguous stamina.

The pith of this plant is remarkable for being traversed longitudinally by bundles of exceedingly dense irregular occasionally branched fibres. These fibres are semi-opaque containing either inside or out, amylaceous granules and consisting of a superposition of at least two fibrous tubes.

Between the wood and bark occur, 1st dense, but small cellular tissue, then a viscid matter, containing the rudiments of fibres, the cambium. The bark is perforated here and there with irregular inter cellular passages.

Aromatico-piperaceous smell, very like that of Sedgewickia hence I was led to look for coniferous markings. These markings are less developed than in Coniferæ, the disk being larger and always opaque.

The vascular system is very little developed, and consists of unrollable ducts of a great size, the fibres of which are occasionally mutually united along the middle.

The fibrous tissue is excessively dense, and external to the vascular, the fibres are of small diameter, and are of punctuated tissue the punctuations being in one or two series, in addition coniferous glandular punctuations are frequent, but apparently always in one row. The fibrous system immediately surround the vessels has occasionally, the limits of the fibres so incomplete, that the vessels appear as if contained in a tube, apparently very frequently perforated, and interspersed here and there with coniferous markings.

HYALOSTEMMA.

Hyalostemmæ sp. Pl. DCLIII.

MICHELIA.

Michelia champaca.

Arbor. elegans 40 pedalis trunco albescent ad altitudinem 30 pedalem non ramosa.

Folia petiolata lanceolata subacuminata integra, subtus ad nervos sparsum pilosa Petiolis basi vaginantibus, (nempe marginib. canalicule circa ramum productis,) a basin usque ad medium canaliculato superne sulcato, tantum canaliculo abrupt terminant.

Floribus axillaribus solitariis, pedicellatis (pedicellis articularis,) primo pallide lutescentes demum, castaneo-maculatis postremanse, omnino brunnea; odoratiss.

Flores bractea spathacea involuta.

Per. polysepalum, sepalis exteriorib. majora lineari spathulatis interior, breviorib. angustioribusque.

Stam. 00, libera hypog. Filam. breviss. connectivum ultra anther in lobule acuto producto. Anth. lineares biloc. adnatæ longit. dehiscentes introrsæ. Torus ovulifer elongatus.

Ovaria undique spicatim imbricato extus seriea. Stylo subulato stigmata recurvo, later, superiora tantum styli decurrente pluriovulato, ovulis biseriatis. foramen hilum versus.

Hab. Platoor. Ins. Madamacca: *August*, 1834.

Ropalopetalum. *Gen. Nov.*

Ropalopetalum.

Frutex longe scandens, ramulis viridescentibus pubescent. foliis alternis breviter petiolatis ovato-lanceolatis, obtuse acuminatis in petiolum coriaceis decurrent. integris, cymis oppositifoliis foliis multoties breviorib. pedunculis compressus modo cornu curvatis ramulis arborum amplectentibus pedicellis rectis subclavatis, floribus ochroleucis. Cal. 3-partit. sepalis cordato-ovatis. Pet. 6 biserialia serie externe sepalis alternante cordata, nervo medio infra apicem in processu clavato, $2\frac{1}{2}$ lineari longa abeunt 3 interior clausa? Stam. hypogyna sessilia. Anth. cuneata connectivo carnoso ultra loculos producto. Anth. adnato extrorsæ. Ovula 4-6 in

toro apice piloso insidentia 1-loculare, 2-ovulata, ovulis erectis styli brevis stigmata complanata.

Hab. In sylvis intra Mergui Kulweng : *Oct.* 1834.

Ropalopetalum uniflorum.

Scandens per pedunculos abortivos. ramulosum uncinatos. ramis flexuosis. petiolis foliisque subtus ad nervos ferrugineo pubescent. foliis lanceolat. acuminat. repandis supra atro-viridib. subtus subglaucis floribus solitariis oppositifoliis, in pedunculo deorsum producto articulatis ibique bracteatis pedicellis pubescent (nec ferrugineo pubescent), sepalis cordatis acuminat. apicibus reflexis. Pet. pubescent 6 exteriora majora, connectiv. apiculis sanguineis. Stigmatibus circiter 10 albidis longit. sulcatis. Ovaria parce sericeo pilosa ? gynophora pilosa insidentio 1 loculare ovulis ad basin loculor. situs.

Hab. In sylvis prope Kulweng : *Dec.* 1834.

Nephrostigma. *Gen. Nov.*

Nephrostigmæ sp.

Frutex ramis flexuosis ramulis ferrugineo-pubescentibus, foliis lanceolatis acuminatis integris, reticulatis, senioribus glabris atro-viridibus, junior læte viridibus. Inflorescentia axillare opposita, racemosa, racemis 2-floris, bracteatis, bracteis cordatis majusculis pedicellis crassis perianthus que extus ferrugineo-velutinis. Cal. 3 sepala, sepalis cordatis æqualib.

Pet. 6, 3 exterior majora sepalis conformia. Stam. 00 subsessilia omnia connectivo punctis rubris oleosis. Anth. adnatæ ovarium iisdem punctis, stylo stigmatic reniforme concavum, ovuli pluribus 1-serialib. Stam. glauco-rubra, ovaria rubra videntur.

Genus ob cal. petalisque conformibus subæqualibus, petalis semper ? clausis, stigmatibus reniformibus facile recognoscendum.

In sylvis Mergui : *Sept.* 1834.

NYMPHÆACEÆ.

Nymphæa.

Nymphæa sp.

Pedunculi uniflori, spithamæi ; sepalis 4, lanceolato-oblongis obtusis extus viridibus intus apicem versus cæruleo-tinctis.

Petalis pluribus, anguste lanceolato-oblongis, interioribus minoribus exterioribus dorso plus minus viridi tinctis; odor of primroses.

Staminib. subbiseriatis intimis effætis? multo minoribus, 17, filamentis complanatis. Anth. lividescent. mucrone obtuso purpurascent.

Stigmatibus comubus 10 obtusis incurvis, infra medium diatat. stigmatosa, punctum rotundum in centro stigmatis commlmunis.

Ovar. semi superum quoad petal et præsertim stamina.

Foliis suborbicularibus, sinus acuti-lobi subdivaricatis, repanda, latissimeque crenatis, vena centrali, e superne visa lineari recta diaphana : subtus saturato-cærulea purpur. venis prominulis viridibus utrinque glabris. Akin to N. stellatæ, but has scarcely any appendages to the antheres.

Barclaya.

Barclāya.

Sepala 5 patentia linearia hypogyna, subæqualia dorso, subcarinata acuta 3 exteriora.

Cor. tubo subcylindrico limbo 7-partito, laciniis subinflexis, oblongis imbricatis exterioribus multo majoribus.

Stam. tubo corollæ ab apice usque ad medium inserta, inclusa filam. filiformia. Anth. connectivo majusculo, apicula brevem producto, adnatæ bilocul. longit. lateraliterque dehiscent.

Ovarium corollæ adnatum, styli 0. Stigma plura subulata erecta, subconniventa apertura in stigma verum obovatum, ovarii parietes attingentia ducens. Ovarium basi calyce persistente stipitat. apice corollæ limbo connivent. corronat. 9-10 loculare loculis materia glutinosa septitis ovulis 00, dissepimentis affixis, funiculo brevi, foramen ab apicem, conspicuum, angustus subbaccatus, corolla calyceque demum erecto obtectus loculis materia glutinosiss. decolori, semina rotundata hispida pilis conices hispidulis albumen farinaceum e lobulis majusculis ovatis discretis lobuli cellulosi materia grumosa copiosa con-tinentes ! Embryo minutus ad basin albuminis hilum prope.

Herba aquatica axi brevissima, aspectu omino monocotyledonea.

Aspectu omnino monocotyled.

Hab. In rivulum ad umbrosiss. Pular : *Oct.* 1834.

Euryale.

Euryale ferox, Pl. DCLVII.

Hab. Bootan : *Dec.* 23*rd*, 1837.

FUMARIACEÆ.

Fumaria.

Fumaria affinis, Pl. DCLVIII. Fig. I.

The flowers of Fumaria are highly irregular, in the first place, the calyx is very indistinct. The envelopes consist of two exterior scales, and four irregular leaves, all of which are carinate, the portion forming the carina being green, all more or less cucullate, and the uppermost one calcarato-saccate at the base. They are each provided with three veins, of which the central one corresponds to the carina, and in its direction the tissue is, in a marked degree longitudinal.

The male organs consist of two flat membranous compound filaments, three-toothed at the apex, each tooth bearing an anther, its veins are three in number of which the central one is most distinct. The lateral anthers are unilocular, the central truly bilocular all are extrorse. The pollen presents 4, and perhaps more grooves or pores,

The pistillum consists of a unilocular uniovulate ovarium; an articulated declinate style, with 4 vessels, and a large stigma, consisting of two lateral subcornute processes, and between these, two rudimentary ones will be found. The vessels belonging to these are close together, so that at first sight, there would appear to be only three bundles, but pressure particularly at the apex of the style demonstrates the existence of 4. The four stigmata are opposed to the 4 leaves of the flower.

This structure is difficult of explanation.

The two scales may be bracteæ approximated, closely to the flower, in which case the inflorescence if more developed, would—be dichotomous, and in this supposition, the two outer larger leaves will be calyx, and the two inner corolla, these being opposite to the two scales as they should be. Here however the alternation is interrupted the bilocular central anthers are evidently opposed to the outer leaves, but the lateral ones have no evident relation, although they may be traced to the sides of each lateral inner leaf or petal. The four carpellary leaves return as is very common to their proper relations, and are opposed to the leaves of the perianth.

The scales have so decided a relation to the bracteæ in structure that I believe this view to be correct.

There seems to me, to be only one mode of explaining the anthers, these are bilocular, the lateral anthers being completely divided into two, in which case each anther would be opposed to the constituent parts of the envelopes.

This, I find is Lindley's view, who however shews that the alternation is quite correct, a circumstance which I had overlooked.

1. Calyx.
2. Petals.
3. Stamina.
4. Ditto.

The only objection to this binary arrangement is in the structure of the ovarium, this however may be of little importance if Papaveraceæ be taken into consideration. But if Lindley is correct in saying that all the 6 stamina are sometimes distinct, no explanation of the sort will suffice.

The opposition however resulting from this is so universal, that it is probable there are two series of stamina, it is besides more consonant with the situation of the bilocular anther to attribute it to pressure, rather than the simplicity of the lateral ones to dislocation.

Examined at a very early stage, when the lateral stamina are very nearly distinct and free, their situation is evidently in pairs opposite to each petal, there is at this period no appearance whatever of the simplicity of the bilocular anther. The situation of the loculi is such as would result from the complete division of a bilocular anther.

I see nothing in Fumaria officinalis corroborative of Lindley's notions as to impregnation, the horns of the stigma are opposite to the sepals, and cause the bulging out as it were of the bilocular antheræ. I can ascertain no twisting of the lateral filaments, all the anthers being without exception extrorsæ. The fact is, that the cavity in which the genitalia are confined is so limited that no peculiar means are necessary to counteract the defect in situation of the anthers, and impregnation is nearly universal. The anthers after dehiscence contract much in size, and shortly after this operation, they beeome removed from the stigma, which is then surrounded by the pollen.

Bocconia is said to be apetalous, if so, so may be Fumariaceæ, the development and origin of the envelopes is perhaps rather calycine than petaline, but the subject is so difficult as to require extensive examination, Papaveraceæ cannot be well understood, the two-leaved calyx and 4-leaved corolla requiring satisfactory explanation. We might combine Fumariaceæ with Papaveraceæ because of Hypecoum which is another instance of incongruous inconsistency. If it ought to be done, then we ought to treat similarly all intermediate forms.

Hypecoum.

Hypecoui sp. Pl. DCLIX.

Herba annua, tenera glaucescens, statura valde variabilis. Radix fusiformis. Petiolis canaliculatis basi dilatatis. Foliorum limbis pinnatis, pinnis sæpius alternantibus sub capillaceis pinnatifidis lobis bi-trilobis. Inflorescentia pluries dichotoma initio cernua. Pedunculi crassiusculi spithamæi interdum pedalis dichotomis ramis foliis 2 capillacei-pinnatifidis oppositis suffultus, ramulo centrale florigero nudo, this continues 2 or 3 times, one of the branches being more or less completely dichotomous.

Flos. expansus bilabiat. labiis rectis sinistrisque sepalis interior patentis deltoides cuspidatis concavis marginibus demum involutis. Petalis erectiusculis labiis biniis utrinque.

Flores laterales ultima foliolis eodem more divisis, stipata. Pedicelli subclavato fructuum cernui. Bracteæ binæ ovatæ, (sepala auctor. sepala sunt) sepalinæ glaucæ ad basin cujusque floris. Sepala 2 æstivatione incurvato-valvata, lato-oblonga apicem versus subcarinata, lutea initio viridia sepaloidea demum omnino petaloid decidua.

Pet totidem bracteis opposita ultra medium (structura singulari) sepalis paullo minora lobis lateralibus oblongis obtusis, centrale (pars antheriform vasc. uno lobis lateral ve-

nulosis. Potius, pedicelli partis antheriformis, alato lobat. lobis postea evolutis,) antheriformem brevi pedicellat. concava lamina pulchra fimbriata, demum recurva, carina obsoleta in centro lutea maculis parvis atro-purpur.

Bracteæ or sepals of terminal or central flower anticous and posticous of the lateral ones, right and left only.

Stam 4 anisomera, his petalis oppositis compositis, illis sepalis oppositis simplicibus. Filamenta carnosa complanata, rugosula, his (sepalinis) paullo brevioribus et $\frac{1}{3}$ angustioribus vasc. centrali unico illis petalis amplexis latioribus et longioribus (bis) vasibus binis, quorum quoque ad marginem interna loculi cujusque currit.

Antheræ adnatæ oblongæ loculis lateralibus omnes biloculares, et statura excepta nulli modo different. the septa of larger ones are more complete.

Pollen ovatum medio plicatum glabrum. Ovarium 4 gonum, oblongum sursum in stylum curvatum centro sulcatum attenuat. Stigma bilobum et secus sulcum stylo decurrens, fol. carpellam bina (right and left,) uniloculare, placentis binis anticis posticisque indistinctis ovulis biseriatis alternant pendulis, structure ordinarie, foram. subconspicua ad apicem ovuli deorsumque spectantes. Fructus siliquiformis, deorsum curvatis, vel nutant subteres utrinque attenuat.

This is a singular plant evidently belonging to Fumariaceæ.

The outer scales or sepals of some authors are perhaps better viewed as bracteæ, to which in some plants of the order, they are extremely akin in structure and form. They may perhaps be considered as bracteæ from viewing the strictly dichotomous nature of the inflorescence in some, and in this case Fumariaceæ may be expected with ternarily subaggregate flowers, and without these outer scales.

The sepals have a curious æstivation, incurvato-valvato, it is only at an advanced stage of development, that they put on the petaloid appearance. The petals presents the

most curious appearance, and one which shews obviously a tendency to pass into anthers, indeed being the expansion of the flowers, casual observation might easily suppose that they were a bona fide part of the male apparatus, which at any rate they certainly aid, for the fimbriated lobe embraces the anther, and thus prevents the dispersion of the pollen in the wrong direction. Its appearance or resemblance to an anther is likewise pointed out by the carina, which may be seen on its centre of its inner surface, and is analogous to the septum of a locellus of bilocular anther.

The structure of the anthers is curious in as much as it points out, that there is a strong tendency to the existence of bilocular and unilocular anthers in the family, and tends to disprove the idea that all are unilocular, some becoming bilocular by adhesion, for there is no proof whatever that those opposite the sepals are compound.

The alternation of the parts remains to be explained.

We have two outer scales, with which 2 sepals alternate, opposite the scales a trilobed body of petaloid nature, and opposite these two compound stamina and the sepals 2 simple stamina, my idea is this, that the outer scales form part of the calyx, which is hence biseriate. The petals are represented by the lobes attached to the antheriferous body, from which their venation is distinct both in nature and origin.

1. { Sepals.
   { Sepals.

2. { Petals.
   { Petals.

Stamina.

Stamina.

Stamina.

Stamina.

Corroborated by development, the antheriform part formed first and cæteris paribus the soonest developed, the stamina opposed to the large sepals open first.

The stamina are 8, of these four are opposite the sepals so understood, and 4 to the petals, the two outermost of the outer series are opposite the scales, and are barren, the two next are simply bilocular, according to the tendency shewn this way by the antheriform body, testa ejus carina. The four inner ones, are united two and two are obviously opposed to the lobes of the antheriform body or petals.

Thus viewed, the only deviation from the due alternation exists in the carpellary leaves, which ought to be opposed to the scales or outer sepals, but the subject of the relation of these leaves to those of the calyx demands rigid investigation.

Fumariaceæ are thus quaternary and the Hypothesis of Dr. Lindley, so far as Fumaria is concerned is corroborated. If the above view is correct the outer scales most form portion of the calyx, because as these in the case of their being bracteæ have nothing whatever to do with the flower, there would be no reason for the opposition of the outermost stamina with them.

What might be the case in a plant with genuine opposite leaves is another thing, there is nothing discordant with the assumption of a flower of two opposite bractes, and two sepals, with two stamina opposite these bractes.

Char. generis. Sepala 4 biserialia, exteriora minora. Petala 2, triloba lobo medio antheriformi-fimbriato. Stam. 4, 2 sepalis majoribus-2 petalis opposita, antheris bilocularibus.

Fructus seliquiformis.

Herba tenera fragilis, foliis pinnatis pinnis pinnatisectis, inflorescent dichotoma, floribus bilabiatis luteis.

1. Plant.
2. Alabastrum.
3. Flower, inner petaloid sepals removed.
4. Bud, sepals removed, the two lateral lobes represent the petals, the inner, the outer squamiform sepal.
5. Bud larger sepals removed, one of the petaliform com-

pound bodies slightly displaced the other in situ, and enclosing one of the compound anther.

6. Petaliform compound body viewed in front shewing the distinct venation of the parts, and the carina representing the septum of a locellus.
7. Flower after expansion, outer sepals, and one of the petaliform compound bodies removed, the other in situ, anthers withered as well as the apex of the filaments.
8. Do. viewed in front.
9. Petaliform compound body, veins not shewn except on pressure.
10. Antheriform lobe in front. 10. Do. laterally.
11. One of the simply bilocular anthers, opposed to the larger sepals.
12. Larger anthers, each composed of two simply unilocular ones opposed to petalisform compound body, the difference in their venation shewn.
13. Dehisced anther laterally.
14. Pollen. 14*a*. immersed in water.
15. Transverse of ovary.
16. Upper part of pistillum (young) laid open.
17. Portion of a long section of a do. of expanded flower.
17*a*. Style and stigmata.
18. Ovulum.
18*a*. Do. long section, second coat not distinct.)

RANUNCULACEÆ.

General Remarks.

In this order, there is a great tendency towards the transformation of petals into stamina, the tendency is at its minimum in those genera which have petals of the ordinary form, at its maximum in those in which the petals are cucullate, the intermediate form existing in those species in which a

scale is present fixed near the base of the petal, or when the base, itself as glandular.

It is to this excessive tendency, that the want of petals in Clematideæ is to be ascribed, and hence we may be led to expect the existence of species belonging to this section in which the transformation is not altogether complete, and this will be proof furnished by induction.

The ovula have only one tegument, which is testa. The closeness of the affinity of Umbelliferæ to this order does not appear to me very satisfactory.

It is true, that there is a remarkable coincidence in habit, but not much more than there exists with certain Compositæ, such as Bidens, and Coreopsis. It is with this great family, that it seems to have very striking affinities, it approaches to it beyond all doubt in the nature of its inflorescence, in the frequent separation of sexes and above all in the difference, in formation between the flowers of the ray and the centre of the umbel, in the adhesion of the calyx with the ovary, in the reduction often even to obliteration of the former organ, in the number of styles and of stigmata.

It certainly has marked differences of which the separation of petals is the most important, for monopetalism may be regarded as at its maximum in Compositæ. In the bicarpellary nature of its ovary it also differs, but such should be the structure of Compositæ.

The different direction of the ovule is not much to be depended on, since in Opercularineæ—a tribe acknowledged by all to be closely allied to Compositæ, the seeds are pendulous. The same remark applies to the presence of albumen, with this difference that in Opercularineæ, the embryo is axile, in Umbelliferæ basilar. That this minute point is not of much value, as indeed might be argued a priori, is indicated by the structure of the seed of Lardizabaleæ as compared with Menispermeæ.

The first tendency towards suppression seems to take place in Valerianeæ, in which the abortive cells are not quite

obliterated, and in some of which the ovary would appear to be really simple. The same may be said of Dipsaceæ, but this statement of simple ovary is opposed to an observation of Mr. Brown, viz., there is no instance known of a simple inferior ovarium.

I think, it can scarcely be doubted that the real relations of Umbelliferæ are in this direction, the only strong objection being its polypetalism. It must not be forgotten that if there be a law of representation in the vegetable kingdom such as there is in the animal, that the relations of Apiaceæ with Ranunculaceæ are quite in order.

The presence of a minute embryo, at one extremity of the albumen is only important as indicating a lower degree of organisation, the formation of albumen being such as to impede the cotyledonary growth of the embryo. It follows as a consequence of this, that the situation of such an embryo must be at the apex of the nucleus.

The idea entertained by some botanists of albumen always pre-existing, which has led Mr. Lindley to suppose, that in those cases in which it is slight in quantity 'it is merely a residium, is erroneous. If it were true, albumen should be distinctly traceable in all the stages of the evolution of an exalbuminous seed, this however is not the case, and the distinction between an albuminous and exalbuminous formation is easy enough.

The dilatation of the base of the petioles is not a mark of a valve, it exists for instance in Rosaceæ, and in Compositæ etc. Even in the opposition of the leaves certain species Spananthe for instance agree with Compositæ.

If my views be correct, we may expect to find Umbelliferæ with tendencies to the formation of pappus.

I may remark, that the value of the minute basilar embryo is completely destroyed by Araliaceæ, in which D C affirms it is nearly equal in length to the albumen, Lindley notices this, but not the discrepancy of his own account in which it is given as in Ranunculaceæ. It is through this

order that Umbelliferæ are related to Sambuceæ, curious enquiries suggest themselves concerning pappus. Vateriana would lead as to suppose, that this organ is more developed according as the flowers are submitted to more or less mutual pressure. This subject can however only be cleared up by ample examination, many exceptions would appear to exist to the idea in Compositæ.

The abortion of the ovaria ought to be examined, particularly as to its constancy with relation to the parts of the flower, because this may suggest other affinities with Compositæ.

I am inclined to doubt the affinity of Vites with Umbelliferæ, it is an instance rather of analogy. The inferior calyx, valvate corolla, and particularly the position of the stamina relatively to this, the plurality of seeds and their direction are all important marks of difference.

I could shew with equal reason affinities with an order, usually, supposed to be far removed, Cucurbitaceæ, in habit articulation, tendrils, (although these fulcra perhaps have not the same origin in the two organs,) in polypetalism, and opposition of stamina.

Through Sambuceæ they pass into Caprifoliaceæ, in some of which a degradation of calyx occurs, and to Saxifrageæ through Hydrangea.

In the inflexion of the stamina during æstivation Vateriana agrees additionally with Umbelliferæ. In this genus there is tendency towards Dipsaceæ, which have connate filaments, indicated by the union of the filaments towards the base where they are adnate to the corolla. The effect of this is the formation of a sort of septum, which with the gibbosity gives somewhat the appearance of a tendency to calcaration.

The æstivation is imbricate, the venation is curious, the primary veins being luminary and axile, mutually giving off cross branches which run across the sinuses, before arriving opposite to each, they give off a branch which however does

not reach to the termination of the axile one, which is clavate, (I have badly explained this.)

The ovary has 6 nerves, three of which occupy one side, two the margins, and one the opposite side, the intervenia are shortly hairy.

The ovula except in situation much resembles those of Compositæ, and like them they are reduced to a single tegument adhering uniformly and as it were identified with the nucleus.

The subsequent coat formed is the embryonary sac, in its earlier stages it is very apparent, but in the perfect seed adheres with the outer coat, with which it is likely to be confounded, it is developed from the base of the nucleus. It has precisely the same structure as the corresponding coat of Compositæ, which is at once known by the areola being occupied with masses of grumous tissue.

The endocarp? subsequently becomes soluble and separates with the seed, it is coriaceous inclining to bony. It might at first sight be mistaken for the testa, but its being evascular, and the presence of the raphe or the inner lining or envelope are sufficient proofs of its nature.

In this Vateriana is the reverse of many and perhaps most Compositæ, in which the immediate envelope of the seed is derived from the embryonary sac, the testa generally separating with the fruit, to the inner paries of which it indeed adheres. The cotyledons are alternate to the raphe.—The style has three vascular fascicles.

Is not the double pappus analogous to the involucel of certain Dipsaceæ.

The assertion, that Gentianeæ have hypogynous disk is not correct, I find in a species of Gentiana common in Bootan, that it is a good deal developed, and distinctly divided into 5 lobes, which lobes as might be expected alternate with the fertile stamina or in other words are opposite to the segments of the corolla, we may hence expect to find decandrous Gentianeæ.

The additional lobes of the corolla alternating with the true lacineæ are mere processes of the sinuses or rather each petal may be esteemed as being 3-lobed, the lateral lobes of two distinct petals being frequently completely connate. This latter view is pointed out by their occasional emargination, the former by the fact that they are completly evascular.

I once had an idea, that in all truly monopetalous corollas, the veins would run both in the axes of the component lacineæ, and in the axes of the sinuses, but Gentianæ at least the species alluded to, is an exception to the contrary, to such a degree that no vascular fascicle is even furnished to the stamina, while the lacineæ are provided with three distinct fascicles, which have in the lamina, the ordinary distribution.

In this respect it agrees with Villarsia. The locule of the anthers are after dehiscence completely opened out and placed back to back, they are in this state much contracted. They recover their original dimensions and form by immersion, and what is curious, lose immediately their red colour.

The last point is, that the whole surface of the ovaria may bear ovula, of this the species alluded to affords an example of baccate fruit. One Cucurbitaceous plant is indeed so like a Vitis (Cissus) that it is impossible to perceive any difference until after a close examination.

To return to Ranunculaceæ, the tendency of the order to produce petals passing into stamina is borne out by the study of the other nearly allied orders, such as Magnoliaceæ Nymphæaceæ, etc. but the transformation may be assumed in these to be retrograde. It will be a curious corroboration if retrograde metamorphosis be found to be more complete than progressive.

Aconitum.

Aconitum lethale, Gr. Pl. DCLX. Fig. III.

Radix fusiformis exambitu radiculas fibrosas proferens, colore (saltem sicca) albido vel chocolate coloured.

Caulis subteres nunc fere sesquipedalis minute puberulis, sursum ramosus. Gemmæ nudæ foliis junioribns imbricatim conduplicativis. Folia alterna interiora ambitu rotundata superiora cordata, ternatim secta, lobis lateralibus bilobatis, terminata cuneata, cæterum medium supra pinnatifida dentata infra integra, dentibus rotundatis, obtuse mucronatis, utrinque subglabra lucida subtus læte viridia infra albida.

Petiole præsertim inferiores, lamina excedentes basi versus paullo dilatato, canaliculato-subglabra. Flos (unico tantum viso) pedunculum axillarem filiformem subgracilem puberulum, folia vix æquans terminans florem paullo infra gerens bracteas vel folia floralia subsessilea trilobula, lobo terminali integriora subopposita, singulus juniorem tantum vidi.

Sepala 5 imbricata 4 subæqualia herbacea subrotundata, quinto difforme longitudinaliter et inæqualiter bisaccato et præalia extus minute pubescens.

Pet 3, 2 in gremia sulcorum sepala recondita sigmoidea flexa, calcarata calcare recurvo obtuso bilabiata, labio superiore bilobo reflexo, inferiore carnosiore integro 3tio inter hæc situ minuta subsaccata.

Stam. subtriginta, exteriorum 1-2 abortiva. Filam subulata basi conspicua dilatata et utrinque denticulata. Anth. introrsu! suborbiculares lividæ, biloculares loculorum linea apice fere confluenta.

Carpella 4 styli filiformes breves, stigmata subcapitata, longitudinaliter et directione suturæ placentariæ! ovula indefinite, transversa pluriseriate.

Aconiti verisimiliter species, sed certe distinct e specie Wallichiana A. feroce.

1. Alabastri lateral view, } bractea removed.
2. Do. front view, }
3. Front view of third petal.
4. Lateral ditto.
5. Lateral view of saccate petal.
6. Front view of do.
7. Outer view of stamen.
8. Inner ditto.
9. Pollen, the polliniferous masses most distinct and very easily separable.
10. Flower irregular sepals removed.
11. Ovary.
12. Do. long section.
13. Ovula.

13*a*. Shewing the direction of its foramen.

An genus novum, Aconito proximo abeo discrepans. Petalis tribus, difformibus sepalaque quinto bicarinato, et a tribu antheris introrsis, anne ideo inter Helleboreas. Pæoniaceasque osculans. E charactere affine videtur A. bifloro, Fisch. D. C. Pr. 1-64.

A. lethale mihi, pedunculis unifloris apicem versus bibracteatis galea navicularia bicarinata, pet sacco angusto calare brevi recurvo, labio reflexo.

Hab. In montibus allioribus Mishmeensia e quibus radices vivas procuravo. Florunt in horta apud Suddyah : *Feb.* 1837.

This is the plant producing the celebrated Bis, or poison of the Mishmees.

Coptis.

Coptis tecta, Wall.* Pl. DCLX. Fig. II.

Caulis e maxima parte subterraneus repens. Radiculæ plurimæ fibrosæ.

* Transac. Med. and Phys. Soc. Cal. nomen certe non retinendum mere adjectivum assamicam amarum.

Petioli basi dilatati carnosi, cauli approximati, summi in squamis bracteiformibus imbricatis scariosis fuscis mutato, squamæ an potius gemmaceæ.

Folium junius in gremio fissuræ basilaris petiola recondita. Petioliis junior. apice cygnoideus nempe deorsum arcuatus, venatio conduplicativa.

Squama terminalis fere axin circa inserta, gremis scapum petiolumque gerens, scapus viridis sulcatus petiolo penultimi 4 plo brevior, apice biflorus. Bractea linearis apice inciso pinnatifida subflores.

Flores nutantes superius fere pendulus, parvi inconspicue albidis.

Pedicellis eodem more 2-sulcata, sulco quoque sepals opposito.

Sepala ovata venosa petaloidea tenuia postico æstivatione imbricativa aperta.

Petala 10 lanceolata subunguiculata vel spathulato-lanceolata, sepalis aliquoties minora cæterum structura similia.

Stam. 00 hypogyna extrorsa sub 4-5 in axam petalis alterna. Filamenta filiformia brevia, antheræ adnatæ subextrorsæ biloculares lateraliter et longitudinaliter dehiscentia flavescentia. bina petalo quoque opposita bina alterna.

An 40 quadriseriati, serie externa et tertia petalis alterna secunda et intima his opposita.

Connectivum ultra anther non product.

Pollen albidum opacum rotundatum aspectu reticulato granulosum, plicis vel poris sub lente w non aspiciendis.

Carpella petalis alterna? an biseriata, axeos summitata nuda subulata introrsum leviter curvata, 1-locularia, ad imidio supero sursum interdum vacua.

Stylus filiformis postica longitud. sulcatus.

Stigma simplex obtusiusculum ovula sub 6, biseriata transverse affixa anatropa tegumento singulo? foramen hilum versus centrum carpella spectans.

1. Alabastri sulci of pedicel correspond with sepal.
2. Do. sepals removed. Petals somewhat spread out.

3. Posticous view of stamen.
4. Anticous do.
5. Lateral do.
6. Pollen opaque.
7. Moistened, rather in water.
8. Ovaria in situ.
9. One do. lateral.
10. Do. inner or posticous or sutural face.
11. Do. laid open, along suture, ovula back of seen.
12. Ovulum front view.
13. Do. lateral.

It is at once obvious, that this is no Coptis, it does not even belong to Helleboreæ, the section in which Coptis is arranged.

It differs only from Anemoneæ in having several ovula to each carpellum, it may probably rank between Auemone and Hellibore, agreeing with the former in its plane petals, with the latter in its pluri-spermous carpella. I am ignorant of most of the genera, and have taken D C as a guide.

It may be a new genus and be thus characterised.

Sepala 5 petaloidea. Pet. 10 subunguiculata nuda. Stam. 00. Ovaria 10 receptaculo centro nudo imposita, pluriovulata subsessilia.

Herba perennis amara, (caulis intus aurea.) Folia triternata secta. Scapas terminalis biflorus.

Habitus ut videtur Coptidis, Anne Knowltoneæ affinis anne Adonidem et Hamadryadea inter locandus.

Vis forte febrifuga.

ANEMONE.

Anemone cynosurus, Gr. Pl. DCLX. Fig. I.

1. Plant.
2. Flower just expanding.
3. Expanded flower.

4. Petal.
5. Oblique view of base and its scale, which is not always present.
6. Outer inner and lateral view of anther.
7. Pistillum inner and lateral.
8. Do. Long section of ovary.
9. Ovulum long section I am not certain about its single tegument.

Hab. Affghanistan Cabul Cat. no. 270.

Naravelia.

Naravelia zeylanica.

Scandens caulibus purpurescent, fol. 1-jugis petiolo longe producto, apice uncinato. fol. ovata subacuminata integra coriacea venosa, utrinque glabra. Paniculis divaricatis racemosis, folia excedent. floribus viridib. suave odoratis.

Cal. 4-sepalus, sepalis ovatis caducis æstivatione involuto valvatis marginibus tomentoso-velutinis.

Pet. 12, si pauciora in stamina converta, clavata viridia.

Stamina circiter 24, an semper biserialia, 1 cujusque seriei cuique petalo opposito. Anth. subsessilis, adnatæ lineares, introrsæ longit. dehiscent, connectiv. carnosu luteum.

Ovaria 10, 12, 18 seriea stipitata, stylus filiformis brevis stigma ovata obliquum. Ovar. 1-loculare, I-ovulat. ovulo pendulo ab apice loculi, foramen hilum prope tegumenta ovuli distincta.

Hab. Mergue. In sylvis Ins Madamaca: *Dec.* 1834.

APPENDIX.

THE FOLLOWING NOTES HAVE BEEN ACCIDENTALLY OMITTED UNDER THEIR PROPER HEADS.

1. *Ocimum.*

Floribus albis, odor. suaviss. Cal. tubo brevi inæqualiter 5-dentat. sepala postice reniforme margines nempe utrinque productæ, dentibus 2 inferior longioribus angustioribusque.

Cor. infundibulif. bilabiat. lab. super. maximo 4-dentato. inferior lineare oblongum, apice denticulat. Stam. didynama deorsum flexa paris superior longiorisque, basi versus dente retrorsu spectanti pilosa. Filam. exserta subulata. Anth. reniform. ovatæ, 1-locularis, stylus filiformis basi purpurescens apice bifidus, stigmata simplicia. Ovaria ordinis nempe e carpellis 4 basibus versus cohærentibus, carpellis 1-locularibus, 1-ovulatis, ovulis erectis.

Didynamia anomalis pare supera nempe majore longioreque, alternatio stamina ut sequenter par inferum edentatum, utrinque labii inferioris oblonge, par superum, inter dentes laterales, et 2 centrales, lab. super 4-fidi, quinte si ad esset, inter dentes duos centralis.

Credi pilosa caulibus tetragonis. fol. ovatis, serratis pellucido-punctat. Inflorescentia verticelat. racemosa bracteata, floribus ternis in axillis cujusque bracteæ, pedicellis nutant

Hab. Mergue. In ruderatis Madamaca: *Oct.* 1834.

2. *Decastrophia inconspicua.* Pl. DCXIII. Fig. IV.

Frutex scandens, foliis longiuscul. petiolat. petiolis utrinque attenuatis, exstipulat. alternis oblongo-ovatis, basi subcordatis palmatisque 5-nervus acuminatis repandis subtus glaucis, paniculis racemosis, racemisve axillarib. petiolis

brevior, floribus minutiss. lutescentibus viridi. Bractea minima ovata ad basin pedicello cujusque.

Cal. in tubo subturbinato ovario adnat. limbo brevissim. 5-dentat. Pet. tot quot dentis calycinæ iis alternant. disco epigyno inserta acuta venta reflexis patentia, æstivatione valvata, marginibus dorsisque ad apices glandulosa.

Stam. totidem petalis opposita cum iis inserta. Filam. brevissima petalis basibus leviter ad nexis utrinque glandula viridescent apice pilifera petalis adnata stipata. Potius petala basibus 2 glandulosa glandulis sessilibus apice piliferis, stamina cuique pari interjecto. Anth. bilocul. adnatæ, longit. dohiscent.

Discus epigynus lutius integer cicatricib. petalor albidis, stylus breviss. Stigma 3 capitata papilosa, Ovar. 1-loculare, 3-ovulat.

Ovulis pendulis, foramen hilum prope.

Olacineis affinis ob petalorum valvationem appendicularique, ob ovarium ovulaque pendula distinct ob ovaria inferum.

Hab. In sylvis intra Mergui et Beiktown : *Dec.* 1834.

Cirrhis oppositifolia, Omnia fere Rhæmnearum et præsertim Gouaniæ affinis : Discrepant ovar. 1-loculare, 8-ovulat. ovulique pendulis, anne potius Santalaceis affinis sed placenta centralis.*

3. *Pierardiæ*, sp. Pl. DLXXXV. A. Fig. XV.

Arbuscula dioica inflorescentia frequentius e trunco ortis, paniculata, paniculis racemosis floribus parvis lutescent sæpius 3 in pedunculo quoque. Pedicellis brevibus, pedunculus excedentib. adjunctionem articulatis, bracteolis minutis ad basin cujusque floris bracteis (ad basi pedunculoso) lanceolatis.

Perianth. (lataque panicula velutina) 4-sepalum, sepalis

* An Mackaya, Arnoth. modecopsis Gr.

subæqualibus æstivatione imbricatis, dorso præcipue ad apices cellulis albidis barbatulis, concavis, intus cellulis oblongis inflatis bullatis.

Stam. 4-6 interdum plura hypogyne, alternatione nulla, aliquis nempe sepalis oppositis, aliquis alternant in 6 sepalosis, fere omnia, alternantib. filam. brevib. subincurvis. Anth. bilocul. longit. lateraliterque dehiscent. Stylus breviss. crassus. Stigma peltata plana, cellulis iisdem barbatulat· Ovar. solidem abortiens.

Fructus edulis et fructus Burmannos inter fere optimus in cellulæ bullatæ materia grumosi repletæ glanduliformes.

Hab. In sylvis densis montanis Madamacca : *Nov.* 1834. Folia abnormalis.

4. Cryptocarya rubiginosa.

Arbuscula, trunco gracili altius ramoso ramulis crassis compressis, petiolis foliorum nervis mediis bases versus pedunculis pedicellisque plus minus ferrugineo-velutinis, fol. breve petiolatis alternis, ad apices ramulorum confertis maximis, longitud. 8-10 uncialib. diametro 3-4 oblongo lanceolat. acuminat. subintegris coriaceis subtus glaucescent et reticulatis, petiolo interdim ad apicem inferne glanduloso. Racemis axillaribus paniculatis, nempe ramulis inferior, 2-3 floris, petiolis duplo longiorib. floribus inconspicuis lutescente viridescentib. odoratis.

Per. connivens, 6-sepala, sepalis ovatis dorso plus minus ferrugineo-pubescent-exterior æstivatione valvat. interior imbricat. Stam. 3 serialia, seriebus duabus exterior introrsis, staminodia 2 serialia 9, omnino libera nec filam. stipantia, carnosiss. angulat. subantheriform lutescente omnia breve stipitat. filam. pilos. Anth. bilocellat. Ovar. ovat. 1-locul. 1-ovulat. ovulo pendulo ab apice loculi, foram. superum hilum versus, stylus subulat. stigma subsimplex.

Stam. 6 exterior, per paria utrinque filamentor 3 interme-

dior vel sepalis interior opposit. adjecta sed libera 3 interior saminib. exterior oppositis et interioribus alternantia.

HAB. Mergue. Ad summitat. collis Palor. *Jan.* 1835.

5. *Vitex elegans.*

Arbor. humilis, ramulis ad apices foliosis, petiolis pedunculisque ferrugineo-pubescent, fol. longe petiolat. quinate digitat. foliolis juniorib. ovato-ellipticis subintegris, subtus reticulat. petiolis petiolulisque supra canaliculat. Cymis axillaribus divaricat. petiolos. excedent. pluries dichotomis, ramis ramulisque quadrati-compressis. Bracteis parvis membranaceis deciduis. Floribus numerosiss. elegantibus, suave odoratis.

Cal. tubulosus brevis, breviter 5 dentat. persistens. Cor. bilabiat. tubo calyce excedent subinflat. lab. superior bifido lateralibusque albidis oblongis reflexis, 9 5 medio, lab infer. porrecto, obovato spathulato pallide cœruleo basi lutescente pulchra barbata, barba purpurasc. Filam. didynam. pallide corulia, glanduloso-pubescent parceque pilosa. Anth. atro purpureæ transverse dehiscent. Pollen alba stylus ejusdem coloris in filam. Stigma bifidis. Ovar. biloculare, placentis nempe accretis loculis 2 ovulatis, ovulis pendulis ab apicib. loculor. foramen inconspicua interior.

HAB. In horto meo, beato Mergui: *March*, 1835.

Æstivat. imbricato, lobo medio lab. inferioris intimo! labi super extimo. Pet lab. inferior articulat. sublente $\frac{1}{10}$ minute punctulat.

6. *Chionanthus terniflorus.*

Arbor. mediocris, ramulis alternantia compressis simplicibus fol. ovata obovatave, acuminata integra subrepanda, vix coriacea, subtus pallida, venis secondariis distinctis et distinctæ intra marginem arcuata nexis.

Inflorescentia axillaris spicato-glomorata, sæpius e capitulis, 2 lateralibus, 3-floris, spica terminata 5-floro, floribus 3 summis capitulatis, vel terminatis tantum adest.

Pedunculus pubescens petiolis 3 linearibus duplo longior florem parvi inconspicua ino-dora, omnes terminalis excepta bractea parva suffulta, alba calyx brevis, admedium 4 partit. persistens. Cor. dipetala, petala ultra media bipartita, lacineæ lineares, obtusæ involuto-concavæ, linea junctionis evidens, ideoque e 4 conflata, petalis in platangibus duabus lateralibus accretis.

Stam. basi utriusque plalangis inserta, fissura opposita. Filam brevissima, connectivum carnosum. Anthera adnata ovata, extrorsa bilocularis loculis longitud. dehiscent medio longitudinaliter septa flores demum planis. Pollen album ovata sulcat.

Ovar. subglobosum biloculare, ovula bina cuique loculo collateralia pendula e axillia sublageniformia ob collum exostom. stylus ovaria longitudine subulatus, ovarium pubescens stigma bifidum, demum connivens divisiones anticæ posticæque ideoque his sepalis nec petalis opposit.

Fructus no isus.v

Hab. Assam. Sudiya prope ripam Burrumpootur: *April* 15*th*, 8836.

Chionanthi species dichotoma Roxb. fl. Ind. 1. 107, Linociera est. Intermedias inter Chionanthem et Linocieram. Structura irregularis ob oppositione stigmata cum sepalis.

7. *Ligustrum punctatum.*

Arbor. majuscula, 20 30 pedalis. Folia opposita, oblongo lanceolata acuminata obtusa, integra coriacea, pellucido-punctata, venis subintra marginalibus, juniora sparsim pubescentia. Flores paniculati inconspicui lutescentes subsessiles, plerumque ternatim aggregati. Paniculæ terminales pubescentes, ramulis divaricatis. Bractea lanceolato-foliacea pubescens ad basin cujusque ramulis. Bracteola linearis cinque flori.

Cal. tubulos. pubescens 4-dentat. dentibus rotundatis, 2 lateralib. paulo majoribus. Cor. infundibulif. tubo obtuse quadrangulari, limbo 4-dentato, dentibus erectis obtusis, subcucullatis. Stam. 2 epipetala. Filam. breviss. basi corolla affixa petalis 2 alternantia. Anth bilocul. longitud. dehiscent. Ovar. ovat. 2-loculare, loculis 2-ovulatis ovulis pendulis foramen ad hilum. Stylus sub 0. Stigma capitat. transverse sulcat.

Æstivatio corollæ valvat. corolla exserta.

Hab. In sylvis circa Molamyain: *Dec.*, *Jan.* 1834.

8. *Osyris rotundata*, Pl. DCXXVII. Fig. 1I.

Frutex volubilis, ramis ramuloso-flexuois viridibus. Foliis alternis obovatis in petiolum attenuatis junioribus spathulato-obovatis carnosis integerimis glaberia obtusis basi 5-veniis.

Floribus axillaribus parvis viridibus aggregatis pedicellis bracteolatis sæpius unifloris interdum racemiformibus.

Filam. breviss. Anth. composed of two subreniform loculi placed obliquely.

Calycis tubus subglobosus, laciniis lata ovatis erectis vel etiam conniventibus stylus per brevis. Stigmata 5 parvis, radiantia:

Ovarium subbaecat.

Discus epigynus parum elevatus concavus sub 5 gonus.

Placenta infra centrum mammilliforme ovulis 5 circa basi radiatum affixis deorsum spectant nuclearum apice sacculi embryonis globoso $\frac{1}{2}$ exserto.

Bacca drupa initio rubra demum atro-perp. urceolata, tubo globoso, calyce immulato et coronata.

Pyrena apice mammillata 5-6 sulcata angulata, angulis rotundatis.

Semen 1 albumen pyrene profunde intrante 4-5 divisum, lobes of albumen on a transverse section obcordate.

Hab. Malacca. In sylvis secus litora Daris: Tangong cling.

Vegetation peculiar chiefly of Eugenia trees, with one or two Guttiferæ as Calophyllum, Garcinia.

A Thibaudia very common as a shrub, Dalbergia, Premna, Dodonæa rare, Hoya grandifiora alia.

The above Santalaceous plant is very much like one, from mount Ophir, Pudhan Bhattoo.

This is distinguished from the other Malacca, species by its fleshy, scarcely coriaceous leaves, by the aggregation of the female flowers in the axills, and by the shape of the calyx, especially in its young stages.

Osyris foliis carnosis vix coriaceous, floribus fæmin. aggregatis, alabastis turbinatis, calycis tubo cito globoso.

There also appear to be no hairs at the back of the stamina.

9. *Strophanthus scandens ?*

Frutex scandens ciliis interpet. 00, fol. opposit. breve petiolatis oblongo-obovatis leviter repandes, cuspidato-obtuse acuminatis subtus albidis venis secondariis conspicue arcuati nexsim, venis cæterum parum elevatis vel cymis terminalibus multifloris gradatum.

Pedicellis brevibus robustis sepalis e basi gibbo convexo, longe acuminatis.

Cor. contorta, nfundibule tubo media constricto fere uinciali. Fauce aperta coronata squamis petaloideis bipartitis cum laciniis alternant.

Filam. libera vix 0. Anth. subsagittatæ connectivis longe in setis productes, conniventibus subtortes, filamentes in adhering parts above the middle suddenly thickened lower $\frac{2}{3}$ of outer cells empty. Inner cells of another very unequal. Stylus robustus infra facies stigmatos annulatus supra in conum product. Ovarium biloculare cyrthandiform placentis revoluto involuto, in pagina extrorsa ovuliferis.

Folliculi maxime like horns, oblique divaricat. apice obtuse exeisi.

Hab. Malacca. Ayer Punus in thickets sp. formosa.

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